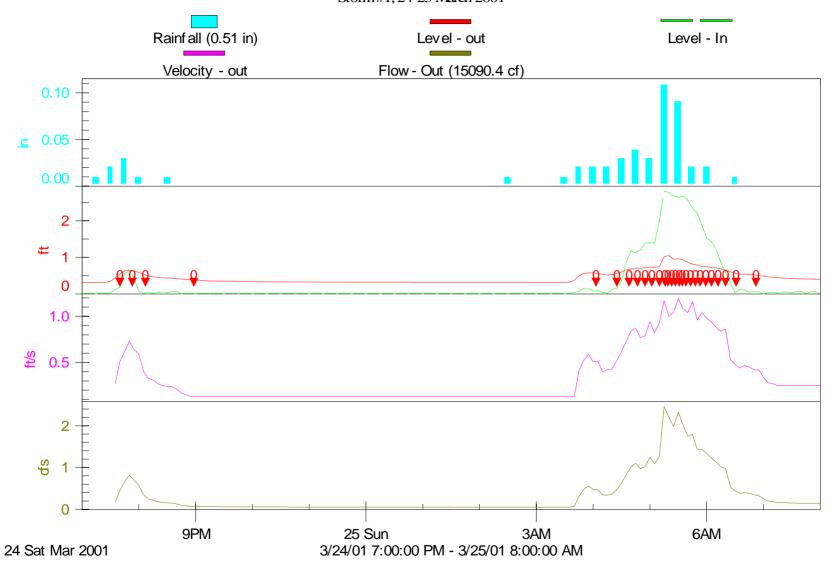
#### **APPENDIX A – Storm Event Monitoring Results**

The contents of Appendix A are organized by storm event number 1 through 11. The materials included for each storm event are:

- 1. Storm Event Graph that shows rainfall, inlet and outlet water level, outlet water velocity and flow rate, and sample event marks (noted with the symbol ♀). Total storm event flow volume and rainfall depth are noted the graph legend;
- 2. Full laboratory results from North Creek Analytical;
- 3. Particle size analysis methods and results from UW; and
- 4. Field sheets.

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•		

#### SR 405 Vortechs Storm#1, 24-25 March 2001



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•		



Seattle 11720 North Creek Pswy N, Suite 400, Bothell, WA 98011-8244 425.420.9260 fex 425.420.9210

Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200 tax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 563.906.9210 **Bend** 20332 Empire Avenue, Suite F-1, Bens, 9R 97701-5711 541.383.9310 fax 541.382.7588

#### PROJECT NARRATIVE for B1C0577

Client: Taylor Associates Project Manager: Ingrid Wertz Project Name: SR405 Vortechs Project Number: Not Provided

#### 1.0 DESCRIPTION OF CASE

Two water sample were received for the analysis of:

- Total Zinc by EPA 200.8
- Dissolved Zinc by EPA 200.8
- Hardness by SM2340B
- Orthophosphate by EPA 365.2
- Total Phosphorous by EPA 365.2
- Total Suspended Solids by EPA 160.2
- Turbidity
- PH by EPA 150.1

#### 2.0 COMMENTS ON SAMPLE RECEIPT

The samples were received in 5L Poly bottles then split into the appropriate sample container upon receipt then logged in on 26th March 2001 at a temperature of 4.6C.

#### Preparation and Analysis

The dissolved metals were filtered and preserved in house with Nitric Acid. There were no anomalies associated with the requested analyses, all QA criteria were within method established control limits.

"I certify that this data package is in compliance with the Contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature."

/Project Manager

North Creek Analytical



Seattle 11720 North Creek Fkwy N, Saite 400, Botheil, WA 98011-8244

425,420,9200 fax 425,420,9210

East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9290 fax 509.924.9290

Portland

503.906.9290 fax 503.906.9210 20332 Empire Avenue, Desaverton, OR 97008-7132 503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7598

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported:

04/09/01 11:52

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VOR-032501-IN	B1C0577-01	Water	03/25/01 06:52	03/26/01 11:16
VOR-032501-OUT	B1C0577-02	Water	03/25/01 06:52	03/26/01 11:16

North Creek Analytical - Bothell

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mar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 

Page 1 of 10



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 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509,924,9200 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503 906 9200 fax 503,906,9210

20332 Empire Avenue, Suite F-1, Bend, CR 97701-5711 541.383.9310 fax 541.392.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

# Total Metals by EPA 200 Series Methods

#### North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes		
VOR-032501-IN (B1C0577-01) Water	Sampled: 03	3/25/01 06:52	Receive	d: 03/26/01	11:16			•			
Zinc	0.129	0.0100	mg/l	Į.	1C27040	03/27/01	03/29/01	EPA 200.8			
VOR-032501-OUT (B1C0577-02) Water Sampled: 03/25/01 06:52 Received: 03/26/01 11:16											
Zinc	0.117	0.0100	mg/l	l	1C27040	03/27/01	03/29/01	EPA 200.8			

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Seattle 11720 North Creek Pkwy N, Suite 450, Bothell, WA 98011-8244

Spokane

425.420.9200 fax 425.420.9210
East 11115 Montgomery, Suite B, Spokene, WA 99206-4776
509.924.9200 fax 509.924.9290
9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 Portland 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

**Taylor Associates** 3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

## Dissolved Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-032501-IN (B1C0577-01) Water	3/25/01 06:52	Receive	d: 03/26/01	11:16	•			Q-30	
Zinc	0.0316	0.0100	mg/l	1	1C23028	03/23/01	03/29/01	EPA 200.8	
VOR-032501-OUT (B1C0577-02) Water Sampled: 03/25/01 06:52 Received: 03/26/01 11:16									
Zinc	0.0271	0.0100	mg/i	l	1C23028	03/23/01	03/29/01	EPA 200.8	

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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9209 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Band, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

# Conventional Chemistry Parameters by APHA/EPA Methods North Creek Analytical - Bothell

		Reporting			•				
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-032501-IN (B1C0577-01) Water	Sampled: 0.	3/25/01 06:52	Received:	03/26/01	11:16				
Hardness	38.3	1.00 m;	g eq. CaCO3/L	. 1	1C26045	03/26/01	03/29/01	SM 2340B	
Orthophosphate-phosphorus	ND	0.00200	mg/l	11	1C27008	03/26/01	03/26/01	EPA 365.2	
Phosphorus	0.510	0.0250		5	1C30030	03/30/01	03/30/01	m	
pH	6.78		pH Units	1	1C27059	03/26/01	03/26/01	EPA 150.1	
Total Suspended Solids	200	4.0	mg/l	н	1D02039	03/28/01	03/29/01	EPA 160.2	
Turbidity	152	1.00	NTU	п	1C27060	03/26/01	03/26/01	EPA 180.1	
VOR-032501-OUT (B1C0577-02) Water	Sampled:	03/25/01 06	:52 Receive	d: 03/26/0	01 11:16				
Hardness	40.4	1.00 m;	g eq. CaCO3/L	. 1	1C26045	03/26/01	03/29/01	SM 2340B	
Orthophosphate-phosphorus	0.00259	0.00200	mg/l	н	1C27008	03/26/01	03/26/01	EPA 365.2	
Phosphorus	0.443	0.0250	11	5	1C30030	03/30/01	03/30/01	11	
рH	6.96		pH Units	1	IC27059	03/26/01	03/26/01	EPA 150.1	
Total Suspended Solids	180	4.0	mg/I	rr	1D02039	03/28/01	03/29/01	EPA 160.2	
Turbidity	129	1.00	NTU	11	1C27060	03/26/01	03/26/01	EPA 180.1	



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East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, DR 97008-7132

503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

# Total Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1C27040:	Prepared 03/27/01	Using El	PA 200 Ser	ries							
Blank (1C27040-BL	K1)										
Zinc		ND	0.0100	mg/l							
LCS (1C27040-BS1)	1										
Zinc		0.184	0.0100	mg/l	0.200		92.0	85-115			<del></del>
Matrix Spike (1C27	040-MS1)					Source: 1	B1C0549-	02			
Zine		0.165	0.0100	mg/l	0.200	ND	78.9	75-125			
Matrix Spike Dup (	(C27040-MSD1)					Source: I	B1C0549-	02			
Zinc		0.181	0.0100	mg/l	0.200	ND	86.9	75-125	9.25	20	- · · · · · · -

North Creek Analytical - Bothell

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 Seattle
 11720 North Creek Pkwy N, Suite 400. Botheil, WA 98011-6244

 425-420-9200
 fex 425-420-9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

 509-924-9200
 fex 509-924-9290

Spokane

Portland 9405 SW Nimous Avenue, Beaverton, DR 97008-7132

503.906.9200 tax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97761-5711

541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

# Dissolved Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REÇ		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1C23028:	Prepared 03/23/01	Using E	PA 3005A								
Blank (1C23028-Bl	LK1)										
Zinc		ND	0.0100	mg/l							
LCS (1C23028-BS1	1)										
Zinc		0.192	0.0100	mg/l	0.200		96.0	85-115			
Matríx Spike (1C23	3028-MS1)					Source: E	31C0411-2	20			
Zinc		0.268	0010.0	mg/l	0.200	0.0901	89.0	75-125			
Matrix Spike Dup (	(1C23028-MSD1)					Source: E	31C0411-2	20			
Zinc		0.272	0.0100	mg/l	0.200	0.0901	91.0	75-125	1.48	20	



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

425.420.9200 fax 425.420.9210 Spokane

East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.904.9290 fax 503.906.9210 Fax 503.906.906.900 Fax 503.906.900 Fax 503.906.900 Fax 503.900 Fax

541.383.9310 fax 541.382.7588

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Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1C26045: Prepared 03/26/01	Using I	EPA 3010A								
Blank (1C26045-BLK1)		•							•	
Hardness	ND	1.00mg	g eq. CaCO3/L							
LCS (1C26045-BS1)										
Hardness	74.0	1.00mg	g eq. CaCO3/1,				70-130			
Matrix Spike (1C26045-MS1)					Source: E	31C0468-	34			
Hardness	340	1.00 mg	g eq. CaCO3/L		282		75-125			
Matrix Spike Dup (1C26045-MSD1)					Source: I	31C0468-	34			
lardness	341	1.00 mg	g eq. CaCO3/L		282		75-125	0.294	20	****
Batch 1C27008: Prepared 03/26/01	Using (	General Pre	paration							
Blank (1C27008-BLK1)										
thophosphate-phosphorus	ND	0.00200	mg/l							
LCS (1C27008-BS1)										
Orthophosphate-phosphorus	0.0513	0.00200	mg/l	0.0500		103	90-110			
Ouplicate (1C27008-DUP1)					Source: H	31C0577-	01			
Orthophosphate-phosphorus	ND	0.00200	mg/l		ND			20.1	25	
Aatrix Spike (1C27008-MS1)					Source: I	31C0577-	01			
Orthophosphate-phosphorus	0.0527	0.00200	mg/l	0.0500	ND	102	80-120			
Batch 1C27059: Prepared 03/26/01	Using (	General Pre	paration							
Duplicate (1C27059-DUP1)					Source: B1C0577-01					
Н	6.87		pH Units		6.78			1.32	10	

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East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924,9200 fax 509.924,9290

Portland 9405 SW Nimbus Avenue, Beaverton, CR 97008-7132

503.906.9200 fax 503.906.9210 **Bend** 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

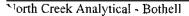
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Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1C27060:	Prepared 03/26/01	Using G	eneral Pre	paration							
Blank (1C27060-Bl	LK1)	· · · · · · · · · · · · · · · · · · ·									
Turbidity	<u></u>	ND	1.00	NTU							
LCS (1C27060-BS1	1)										
Turbidity		21.6	1.00	NTU	20.0		108	90-110			
Duplicate (1C27060	0-DUP1)					Source: I	31C0577-	01			
Turbidity		164	1.00	NTU		152			7.59	20	
Batch 1C30030:	Prepared 03/30/01	Using G	enerat Pre	paration							
Blank (1C30030-Bl	LK1)		· · · · · · · · · · · · · · · · · · ·								•
Phosphorus		ND	0.00500	mg/l							
LCS (1C30030-BS)	<b>(</b> )										
hosphorus	<del></del>	0.0507	0.00500	mg/l	0.0500		101	90-120			
Matrix Spike (1C30	0030-MS1)					Source: I	31C0579-	01			
Phosphorus		2.50	0.0500	mg/l	0.500	2.08	84.0	60-139			
Matrix Spike Dup (	(1C30030-MSD1)					Source: I	31C0579-	01			
Phosphorus		2.51	0.0500	mg/j	0.500	2.08	86.0	60-139	0.399	25	
Batch 1D02039:	Prepared 03/28/01	Using G	eneral Pre	paration							
Blank (1D02039-BI	LK1)										
Total Suspended Solid	5	ND	4.0	mg/l							



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Spokane East 11115 Montgomery, Suite B. Spekane, WA 99206-4776

509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.392.7588 Bend

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

}		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
B / 1 1 D 0 1 0 2 0 D	102/00/04 11 1	- I.D								

Batch 1D02039:	Prepared 03/28/01	Using Ger	ieral Prej	paration				
Duplicate (1D02039	9-DUP1)				Source: B1C0629-05	5		
Total Suspended Solid	S	15	4.0	mg/l	15	0.0	19	

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425.420.9200 fax 425.420.9210 Sonkare Fast 11115 Montonmery Suite

ane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

509.924.9290 tax 509.924.9290 **Portiand** 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite ₹-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates Project: SR405 Vortechs

3917 Ashworth Ave North

Seattle WA, 98103

Project Number: Not Provided
Project Manager: Ingrid Wertz

Reported: 04/09/01 11:52

#### **Notes and Definitions**

Q-30 This sample was laboratory filtered since it was not field filtered as is required by the methodology.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

Appendix B- field sheets.xls, CoC - SR405	Appendix B-1	_		,	Ž,						-					3/23/01	
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						Company Data/Time		<u>.</u>		<u> </u>	2/4		Company Date/Time	,			
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					ded by	Date recorded by:	Dat				University of Washington	ty of W	Universi	or _	alytical	Laboratory: North Creek Analytica	<u>[</u>
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Appendix B- field sheets.xls, CoC - SR405

#### PSD, TSS, VSS Procedures

Prepared 8/21/01 by the University of Washington Department of Civil Engineering

- Calibrate weighing tins + blank filter papers (size: 4.7cm) by placing them in 105° C oven for ~2 hrs.
- 2. Measure sample volume.
- 3. Pour sample through 850-, 425-, 212-micrometer sieves (in that order from top to bottom!)
- 4. Place sieves upside down into corresponding marked beakers & rinse through with distilled water.
- 5. Take remaining sample to particle size analyzer (PSA).
- Rinse PSA chamber with milli-q water.
- 7. Aquire background sample with milli-q water (see manual for instructions). It is important to minimize the amount of bubbles in the chamber.
- 8. After calibration aquire 3 readings for each sample (3 separate subsamples). It is best to re-calibrate between samples. Be sure to note the number assigned by the PSA to each reading. Also keep drained subsamples for later analysis.
- 9. Rinse chamber.
- 10. Take sample including the portions run through the sieves to vacuum pump.
- 11. Take weighing tins with filter papers out of the oven and record the dry weights. First, remember to always calibrate the scale.
- 12. Place filter paper onto the vacuum pump and secure.
- 13. Pour each size fraction through and record which tin # goes with which size fraction.

  Remember to rinse off any particles that may stick to vacuum device onto the filter paper.
- 14. Set the tins back in the 105° C oven for ~2 hrs.
- 15. Calibrate scale, weigh and record post dry weights. These numbers will be used to calculate TSS values.
- 16. For VSS values, place tins in 550° C oven for 15-20 mins. Then repeat step 15.

#### Report

- 1. Total mass is calculated for the volume of sample that is given to us.
- 2. The D-values are calculated based on particles that are < 212.
- 3. Mass is calculated by multiplying %vol by TSS for each size fraction, then summing for a total.

	•		

## Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz **Taylor Associates** 

Tel: 206.633.4486

Analysis Performed by: Joyce Chang University of Washington Department of Civil Engineering

Cumulative

Contact: Dr. David Stensel Tel: 206,543,9358

Volume:

Concentration

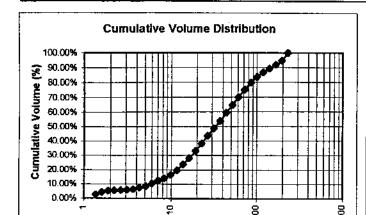
Project ID:

SR405 - Vortechs

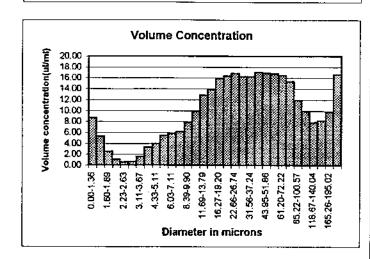
Sample ID: Date and Time Collected: VOR-032501-IN 3/25/01 6:52am

Date and Time of PSD Analysis;

3/26/01 5:46pm



Diameter in microns



(microns)	(1471)	(%)	CONCERNOUS.
0.00-1.36	8.75	2.75%	(nig/1)
1.36-1.60	5.28	4.41%	5.59
1.60-1.89	2.58		3.37
1.89-2.23		5.22%	1.65
	1.10	5.56%	0.70
2.23-2.63	0.57	5.74%	0.36
2.63-3.11	0.64	5.94%	0.41
3.11-3.67	1.61	6,45%	1,03
3.67-4.33	3.31	7.49%	2.11
4.33-5.11	3.96	8.73%	2.53
5.11-6.03	5.46	10.45%	3.48
6.03-7.11	5.84	12.28%	3.73
7.11-8.39	6.20	14.23%	3.96
8.39-9.90	7.81	16,68%	4.99
9.90-11.69	9.91	19.80%	6.33
11.69-13.79	12.85	23.83%	8.20
13.79-16.27	13.87	28.19%	8.85
16.27-19.20	15.89	33.18%	10.14
19.20-22.66	16.38	38.33%	10.46
22.66-26.74	16.84	43.62%	10.75
26.74-31.56	16.29	48.74%	10.40
31.56-37.24	16.26	53.85%	10.38
37.24-43.95	17.10	59.22%	10.91
43.95-51.86	16.90	64.53%	10.79
51.86-61.20	16.81	69.81%	10.73
61.20-72.22	16.49	74.99%	10.53
72.22-85.22	15.38	79.82%	9.82
85.22-100.57	11.90	83.56%	7.60
100.57-118.67	9.91	86.67%	6.33
118.67-140.04	7.82	89.13%	4.99
140.04-165.26	8.21	91.71%	5.24
165.26-195.02	9.72	94,76%	6.21
195.02-230.14	16.68	100.00%	10.65
Total	318.29		203.20
			200.20

Computed Statistics:

Weight Mean = 58.92 microns

 $D_{10} =$ 5.11 microns  $D_{50} = 31.56 \text{ microns}$ 

 $D_{90} = 140.04 \text{ microns}$ 

Volume of Sample:

800 ml

Volume of Dilution:

1200 ml added

Comments: The sample was diluted with deionized water. VSS was not measured for the sample.

Size Range

IMOTORS

< 212

212-425

425-850

>850

Total

Mass of 155

203.20 • 40

4.40

2.20

2.70

212.50

% Mass

95.62%

2.07%

1.04%

1.27%

100.00%

#### Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz **Taylor Associates** 

Tel: 206,633,4486

Analysis Performed by: Joyce Chang University of Washington Department of Civil Engineering Contact: Dr. David Stensel

Volume Cumulative

Tel: 206.543,9358

Size

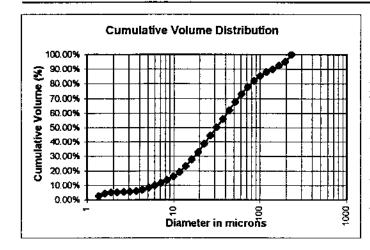
Project ID: Sample ID: SR405 - Vortechs VOR-032501-OUT

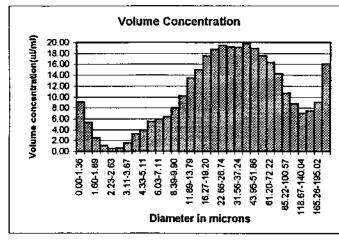
Date and Time Collected:

3/25/01 6:52am

Date and Time of PSD Analysis:

3/26/01 8:00pm





Range	Concentration	Volume	Concentration
(microns)	(ul / 1)	(%)	(mg / I)
0.00-1.36	9.05	2.73%	4.89
1.36-1.60	5.33	4.33%	2.88
1.60-1.89	2.53	5.09%	1.37
1.89-2.23	1.04	5.41%	0,56
2.23-2.63	0.53	5.56%	0.28
2.63-3.11	0.60	5.75%	0.33
3.11-3.67	1.55	6.21%	0.84
3.67-4.33	3.24	7.19%	1.75
4.33-5,11	3.91	8.36%	2.11
5.11-6,03	5.50	10.02%	2.97
6,03-7.11	5.94	11.81%	3.21
7.11-8.39	6.39	13.73%	3.45
8.39-9.90	8.02	16.15%	4.33
9.90-11.69	10.23	19.23%	5.53
11.69-13.79	13,45	23.28%	7.27
13.79-16.27	14.96	27.78%	8.09
16.27-19.20	17.50	33.05%	9.46
19.20-22.66	18.70	38.68%	10.11
22.66-26.74	19.45	44.54%	10.51
26.74-31.56	19.14	50.30%	10.34
31.56-37.24	19.08	56.04%	10.31
37.24-43.95	19.73	61.98%	10.66
43.95-51.86	18.85	67.66%	10.19
51.86-61.20	17.58	72.95%	9.50
61.20-72.22	16.32	77.86%	8.82
72.22-85.22	14.23	82.15%	7,69
85.22-100.57	10.75	85.38%	5.81
100.57-118.67	8.76	88.02%	4.73
118.67-140.04	7.08	90.15%	3.83
140.04-165.26	7.50	92.41%	4.05
165.26-195.02	9.11	95.15%	4.92
195.02-230.14	16.10	100.00%	8.70
Total	332.17		179.50

Computed Statistics:

Weight Mean = 55.90 microns

5.11 microns  $D_{10} =$ 

26.74 microns

 $D_{90} = 118.67 \text{ microns}$ 

Volume of Sample:

1m 008

Volume of Dilution:

1200 ml added

Comments: The sample was diluted with deionized water. VSS was not measured for the sample.

Size Rame

(microns)

< 212

212-425

425-850

>850

Total

Mass of TSS

(mg)

179.50

0.90

0.60

0.30

181.30

% Mass

99.01%

0.50%

0.33%

0.17%

100.00%

	SITE VISIT S	HEET (SR 405 Vor	techs	Monitoring)	
Date/Time	5/24/01/10/QD F	rield Staff   W	Weather_	cluf ~50.	
_	Pre-Stron	n Visit - or - Post-Storm Vis	sit (circle	опе)	
	INLET			<b>OUTLET</b>	
ISCO T	t Readings / Download: Time? reset (Y/N)? Time downloaded	,	CO I	t Readings / Download: Fime? reset (Y/N)? Level (ft.) Velocity (f/s) Flow (cfs) Fotal Flow (cf) Sig/Spec str. Fime downloaded	3141 ,03 (px D.U 111 385 0/0
		Pre - Storm Visit		I MIC dominoacou	
Sampler tubing Strainer ok? Ext. desiccant	k (Y/N)? Replaced? g ok (Y/N)?  ok (Y/N)? Changed? ok (Y/N)? Changed?	Y S S S S S S S S S S S S S S S S S S S	ampler tubing trainer ok? ext. desiccant nt. desiccant deasure Dn le	ok (Y/N)? Replaced? g ok (Y/N)? ok (Y/N)? Changed? ok (Y/N)? Changed? evel? Ok?	V/N V/N V-rud new to
Sample Volum Inspect Rain C			nable level ( acing (cf) / S	n) Sample Volume (ml)	900 0 200 ml
inspect Ram C	-	Post - Storm Vis	<u>it</u>	OX 1997 FIRM	
Sampler Enab Composite Be Number of sul Any subsampl Last Sample (	INLET In Completely? led (date/time)? legan (date/time)? bsamples taken? le collection errors? date/time)? Volume Collected (mi)		Sampler Enab Composite Be Number of su Any subsamp Last Sample ( Est. Sample V Sample ID?	Volume Collected (ml)	
Y/N	Value	Storm V	alidation C	riteria	
	hrs. (if known)	Was there an antecedent dry p	period of at le	0.25"?	1
	in.	Was total rainfall greater than Was runoff duration greater t	han one hour	?	<u> </u>
	hrs.	· · · · · · · · · · · · · · · · · · ·			<del></del>
Y/N	Value	Flow-weighted Comp	osite Sample	e Validation Criteria	
1/17	% (approx.)	Was greater than 75% of the	total volume	of the storm sampled?	$\dashv$
<del></del>	# subsample	Were at least 10 sub-samples	collected at	the inlet?	$\dashv$
-	# subsample	Were at least 10 sub-samples	collected at	the outlet?	
Was a field d	luplicate collected? If so,	_		collected? If so, Sample II	),

NOTES (including any problems with equipment or maintenance activities performed):

# SITE VISIT SHEET (SR 405 Vortechs TM Monitoring)

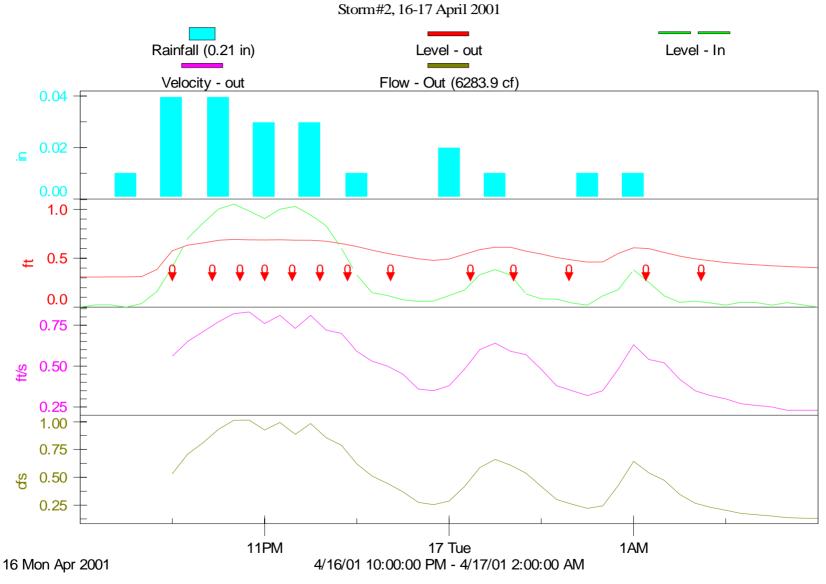
Date/Time 3/2< 101 8:30	Field Staff 16	Weather ourcest ~45	<del></del>
Pre-Str	rom Visit - or - Post-Stori	m Visit) (circle one)	
<u>INLET</u>		OUTLET	
Check Current Readings / Download ISCO Time? reset (Y/N)? Time downloaded	d: / / / / / / / / / / / / / / / / / / /	Check Current Readings / Download ISCO Time? reset (Y/N)? Level (ft.) Velocity (f/s) Flow (cfs) Total Flow (cf) Sig/Spec str. Time downloaded	0.381 5 0.74 k 0.00 t 13 33 8 0 lever fold 6
	Pre - Storm	<u>Visit</u>	
Battery (V) Clean bottle (Y/N)? Pump tubing ok (Y/N)? Replaced? Sampler tubing ok (Y/N)? Strainer ok? Ext. desiccant ok (Y/N)? Changed? Int. desiccant ok (Y/N)? Changed? Measure Dn level? Ok? Sample Volume (ml) Inspect Rain Gage	(TEXT . MINERS).	OUTLET  Battery (V)  Clean bottle (Y/N)?  Pump tubing ok (Y/N)? Replaced?  Sampler tubing ok (Y/N)?  Strainer ok?  Ext. desiccant ok (Y/N)? Changed?  Int. desiccant ok (Y/N)? Changed?  Measure Dn level? Ok?  Enable level (ft)  Pacing (cf) / Sample Volume (ml)	12:31 - Minus
	Post - Storm		
Equipment Ran Completely? Sampler Enabled (date/time)? Composite Began (date/time)? Number of subsamples taken? Any subsample collection errors? Last Sample (date time)? Est. Sample Volume Collected (ml) Sample ID?	1/14 10.07 3/14 19.35 	Equipment Ran Completely? Sampler Enabled (date/time)? Composite Began (date/time)? Number of subsamples taken? Any subsample collection errors? Last Sample (date/time)? Est. Sample Volume Collected (ml) Sample ID?	3/14 19:40 3/14 19:40 27 N (1:5 6:52 156 V 168 -0:2750 = 564
Y/N Value	Stori	m Validation Criteria	¬ ,
hrs. (if known)	Was there an antecedent d Was total rainfall greater t	ry period of at least six hours?	Ju
Y/N Value	Flow-weighted Co.	mposite Sample Validation Criteria	٦
y % (approx.)	Was greater than 75% of t	he total volume of the storm sampled?	
	Were at least 10 sub-samp Were at least 10 sub-samp		-
Was a field duplicate collected? If so,	1.	Field blank collected? If so, Sample ID	. <u>//</u>
NOTES (including any problems with	aquinment or maintenance	activities performed):	•
missed Simple li		activities periorifica).	
	,		

# STORM EVENT

NUMBER 2

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•		

SR 405 Vortechnics



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•		



Seattle 11720 North Creek Pkwy N, Suite 400, Botheil, WA 98011-8244

425.420.9200 fax 425.420.9210

Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4775

509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suita F-1, Bend, DR 97701-5711 541.383.9310 fax 541.382.7588

#### PROJECT NARRATIVE for B1D0427

Client: Taylor Associates Project Manager: Ingrid Wertz Project Name: SR405 Vortechs Project Number: Not Provided

#### 1.0 DESCRIPTION OF CASE

Two water sample were received for the analysis of:

- Total Zinc by EPA 200.8
- Dissolved Zinc by EPA 200.8
- Hardness by SM2340B
- Orthophosphate by EPA 365.2
- Total Phosphorous by EPA 365.2
- Total Suspended Solids by EPA 160.2
- Turbidity
- PH by EPA 150.1

#### 2.0 COMMENTS ON SAMPLE RECEIPT

The samples were received in 5L Poly bottles then split into the appropriate sample container upon receipt then logged in on 17th April 2001 at a temperature of 12.7C. The samples were received outside the recommended temperature range of 4C ±2C but since they were received within 4 hours of collection they may not have had time to equilibrate with the coolant.

#### Preparation and Analysis

The dissolved metals were filtered and preserved in house with Nitric Acid. The Matrix Spike duplicate recovery was outside the method established criteria; since the remaining QC samples are acceptable this does not represent an out-of-control condition for the analytical batch. There were no anomalies associated with the remaining analyses; all QA criteria were within method established control limits.

"I certify that this data package is in compliance with the Contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature."

Amar Gill Project Manager North Creek Analytical



| Seattle | 11729 North Creek Pkwy N, Seite 400, Bothell, WA 98011-8244 | 425,420,9200 | fax 425,420,9216 | Spokane | East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 | 509,924,9200 | fax 509,924,9290 |

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, GR 97701-5711

541.363.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/01/01 17:12

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VOR-041701-IN	B1D0427-01	Water	04/17/01 01:21	04/17/01 15:15
VOR-041701-OUT	B1D0427-02	Water	04/17/01 01:21	04/17/01 15:15



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 425.420.9200 fax 425.420.9210

Spokane

East 1115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9260 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588 Bend

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North

Project Number: Not Provided

Reported:

Seattle WA, 98103

05/01/01 17:12 Project Manager: Ingrid Wertz

## Total Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-041701-3N (B1D0427-01) Water	Sampled: 0	4/17/01 01:21	Receive	d: 04/17/01	15:15				
Zinc	0.112	0.0100	mg/l	1	1D18019	04/18/01	04/20/01	EPA 200.8	
VOR-041701-OUT (B1D0427-02) Wate	т Sampled	: 04/17/01 01:2	21 Recei	ved: 04/17/0	DI 15:15				
Zinc	0.0921	0.0100	mg/l	ì	1D18019	04/18/01	04/20/01	EPA 200.8	

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 

Page 2 of 10



 Seattle
 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 425.420.9200
 425.420.9201
 fex 425.420.9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200
 fax 509.924.9200

Spokane

9405 SW Nimbos Avenue, Beaverton, OR \$7008-7132 Portland

503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/01/01 17:12

# Dissolved Metals by EPA 200 Series Methods

#### North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-041701-IN (B1D0427-01) Water	Sampled: 04	/17/01 01:21	Receive	d: 04/17/01	15:15			*****	Q-30
Zinc	0.0374	0.0100	mg/l	l	1D19018	04/19/01	04/21/01	EPA 200.8	
VOR-041701-OUT (B1D0427-02) Water	r Sampled:	04/17/01 01::	21 Recei	ved: 04/17/(	15:15				Q-30
Zinc	0.0316	0.0100	mg/l	1	ID19018	04/19/01	04/21/01	EPA 200.8	<u></u>

orth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

mar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 



503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/01/01 17:12

# Conventional Chemistry Parameters by APHA/EPA Methods North Creek Analytical - Bothell

		Reporting							
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-041701-IN (B1D0427-01) Water	Sampled: 04	4/17/01 <b>0</b> 1:21	Received:	04/17/01	15:15				
Orthophosphate-phosphorus	0.00375	0.00200	mg/l	1	1D18041	04/18/01	04/18/01	EPA 365.2	
Phosphorus	0.221	0.0100	"	2	1D30047	04/30/01	04/30/01	N	
рН	6.47		pH Units	1	1D18026	04/17/01	04/17/01	EPA 150.1	
Total Suspended Solids	140	4.0	mg/l	n	1D20050	04/19/01	04/20/01	EPA 160.2	
Turbidity	78.6	2.00	NTU	2	1D19041	04/18/01	04/18/01	EPA 180.1	
VOR-041701-IN (B1D0427-01RE1) Wa	iter Sample	d: 04/17/01 0	1:21 Recei	ved: 04/1′	7/01 15:15	;			
Hardness	32.3	1.00mg	g eq. CaCO3/L	. 1	1D20023	04/18/01	04/23/01	SM 2340B	
VOR-041701-OUT (B1D0427-02) Wate	r Sampled:	04/17/01 01:	21 Receive	d: 04/17/0	15:15				
Orthophosphate-phosphorus	0.00322	0.00200	mg/l	1	1D18041	04/18/01	04/18/01	EPA 365.2	
Phosphorus	0.286	0.00500	n	"	1D27023	04/25/01	04/27/01	н	
pH	6.56		pH Units	n	1D18026	04/17/01	04/17/01	EPA 150.1	
Total Suspended Solids	120	4.0	mg/l	н	1D20050	04/19/01	04/20/01	EPA 160.2	
Turbidity	77.6	2.00	NTU	2	1D19041	04/18/01	04/18/01	EPA 180.1	
VOR-041701-OUT (B1D0427-02RE1) V	Vater Samp	oled: 04/17/0	1 01:21 Rec	eived: 04	/17/01 15:	:15			
Hardness	36.2	L.00 mg	g eq. CaCO3/L	, 1	1D20023	04/18/01	04/23/01	SM 2340B	

North Creek Analytical - Bothell

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Amar Gill, Project Manager



Seattle 11729 North Creek Pkwy N, Suite 400, Botheil, WA 98011-8244 425.420.9200 fax 425.420.9210

East 11115 Montgomery, Suite B, Spokene, WA 99206-4776

509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.396.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/01/01 17:12

#### Total Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1D18019:	Prepared 04/18/01	Using E	PA 200 Sei	ries							
Blank (1D18019-BL)	K1)										
Zinc	<del></del>	ND	0.0100	mg/l							
LCS (1D18019-BS1)											
Zine		0.206	0.0100	mg/l	0.200		103	85-115			
Matrix Spike (1D180	)19-MSI)					Source: I	B1D0398-0	<b>)</b> 1			
Zinc	<u>-</u>	0.192	0.0100	mg/l	0.200	ND	93.2	75-125			
Matrix Spike Dup (1	D18019-MSD1)					Source: E	B1D0398-0	01			
Zinc		0.197	0.0100	mg/l	0.200	ND	95.7	75-125	2.57	20	

orth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager



 Seattle
 11729 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

 425.420.9200
 fax 425.420.9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

 509.924.9200
 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.393.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North

Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/01/01 17:12

# Dissolved Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1D19018;	Prepared 04/19/01	Using E	PA 3005A								
Blank (1D19018-B	LK1)		·								
Zìnc		ND	0.0100	mg/l				·· ·			
LCS (1D19018-BS1	1)										
Zinc	···-	0.204	0.0100	mg/l	0.200		102	85-115			
Matrix Spike (1D19	9018-MS1)					Source: I	B1D0199-	02			
Zinc		0.181	0.0100	mg/l	0.200	0.0103	85.4	75-125			~
Matrix Spike Dup	(1D19018-MSD1)					Source: F	B1D0199-	02			
Zinc		0.186	0.0100	mg/l	0.200	0.0103	87.8	75-125	2.72	20	

orth Creek Analytical - Bothell

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Project Manager



Seattle 11720 North Creek Pkwy N, Seite 400, Botheil WA 98011-8244 425.420.9200 tax 425.426.9210

East 11115 Montgomery, Suite B. Scokane, WA 99206-4776 509.924.9200 fax 509.924.9290 Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, CR 97701-5711
541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/01/01 17:12

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		ŔPD		
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes	
Batch 1D18026:	Prepared 04/17/01	Using G	eneral Pro	eparation								
Duplicate (1D18026	i-DUPI)					Source: E	31D0414-	01				
рН		6.71		pH Units		6.68			0.448	10		
Batch 1D18041:	Prepared 04/18/01	Using G	General Pro	eparation								
Blank (1D18041-BI	LK1)								<del></del>			
Orthophosphate-phosph	horus	ND	0.00200	mg/l								
LCS (1D18041-BS1	)											
Orthophosphate-phospi	horus	0.0524	0.00200	mg/l	0.0500		105	90-110				
Matrix Spike (1D18041-MS1)					Source: B1D0427-02							
Orthophosphate-phospl	norus	0.0535	0.00200	mg/l	0.0500	0.00322	101	80-120				
Matrix Spike Dup (	1D18041-MSD1)					Source: B	1D0427-	02				
Orthophosphate-phospl	horus	0.0538	0.00200	mg/l	0.0500	0.00322	101	80-120	0.559	25		
Batch 1D19041:	Prepared 04/18/01	Using G	eneral Pre	paration								
Blank (1D19041-BL	.K1)											
Turbidity	<del></del> -	ND	1.00	NTÜ -								
LCS (1D19041-BS1	)											
Turbidity		21.8	1.00	NTU -	20.0		109	90-110				
Duplicate (1D19041	-DUP1)					Source: B	1D0451-0	04				
Turbidity	<del></del>	ND	1.00	NTU		ND			10.5	20		

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager



Seattle 11720 North Creek Pkwy N. Suite 403, Bothell, WA 98011-8244 425.420.9200 fax 425.420.9210

East 11115 Montgomery, Suite B, Spokene, WA 99206-4776 509.924.9290 fax 509.924.9290 Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, DR 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North

Project Number: Not Provided

Reported:

Seattle WA, 98103

Project Manager: Ingrid Wertz

05/01/01 17:12

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

	110.1		Reporting	<del></del>	Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1D20023:	Prepared 04/20/01	Using E	PA 3010A						·		
Blank (1D20023-Bl	LK1)										
Hardness		ND	1.00mg	geq. CaCO3/L							
LCS (1D20023-BS)	)										
Hardness	·	71.8	1.00mg	geg. CaCO3/L	66.2		108	70-130			
Matrix Spike (1D20	0023-MS1)					Source: I	31D0199-	02RE1			
Hardness		306	1.00mg	eq. CaCO3/L	66.2	244	93.7	75-125			
Matrix Spike Dup (	(1D20023-MSD1)					Source: F	B1D0199-	02RE1			
Hardness		309	1.00mg	eq. CaCO3/L	66.2	244	98.2	75-125	0.976	20	
Batch 1D20050:	Prepared 04/19/01	Using G	eneral Pre <sub>l</sub>	paration							
Blank (1D20050-Bl	LKI)					<del></del>					
otal Suspended Solid	s	ND	4.0	mg/l							·•
Duplicate (1D20050	D-DUP1)					Source: F	31D0420-	01			
Total Suspended Solid	S	37	4.0	mg/l		40			7.8	19	
Batch 1D27023:	Prepared 04/25/01	Using G	eneral Pre	paration							
	LK1)				_						
Phosphorus		ND	0.00500	mg/l							
LCS (1D27023-BS1	)										
Phosphorus		0.0532	0.00500	mg/l	0.0500		106	90-120			

North Creek Analytical - Bothell

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Amar Gill, Project Manager



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 425.420.9200 | fax 425.420.92101

East 13115 Montgomery, Suite B, Spokane, WA 99206-4776 Spokane 509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

E03.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

**Taylor Associates** 

Project: SR405 Vortechs

3917 Ashworth Ave North

Project Number: Not Provided

Reported:

Seattle WA, 98103

Project Manager: Ingrid Wertz

05/01/01 17:12

#### Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

		Reporting		Spike Source %REC RPI						)		
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes	
Batch 1D27023:	Prepared 04/25/01	Using G	eneral Pre	paration	•							
Matrix Spike (1D270	023-MS1)					Source: E	31D0438-	04				
Phosphorus		0.406	0.0100	mg/l	0.0500	0.355	102	60-139				
Matrix Spike Dup (1	D27023-MSD1)		Source: B1D0438-04									
Phosphorus		0.416	0.0100	mg/l	0.0500	0.355	122	60-139	2.43	25		
Batch 1D30047:	Prepared 04/30/01	Using G	eneral Pre	paration								
Biank (1D30047-BL)	K1)											
Phosphorus		ND	0.00500	mg/l								
LCS (1D30047-BS1)												
Phosphorus		0.0524	0.00500	mg/l	0.0500		105	90-120				
Matrix Spike (1D300	Source: B1D0427-01											
Phosphorus		0.336	0.0100	mg/l	0.100	0.221	115	60-139	···			
Matrix Spike Dup (1	D30047-MSD1)					Source: I	31D0427-	01				
Phosphorus		0.383	0.0100	mg/l	0.100	0.221	162	60-139	13.1	25	Q-(	

North Creek Analytical - Bothell

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Amay Gill, Project Manager



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 425.420.9200 | fax 425.420.9210

Spokane

East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, 08 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates Project: SR405 Vortechs 3917 Ashworth Ave North

Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported:

05/01/01 17:12

#### **Notes and Definitions**

Q-01 The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the

recovery for this analyte does not represent an out-of-control condition for the batch.

Q-30 This sample was laboratory filtered since it was not field filtered as is required by the methodology.

DET Analyte DETECTED

Analyte NOT DETECTED at or above the reporting limit ND

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

North Creek Analytical - Bothell

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Gill, Project Manager

North Creek Analytical, Inc. Environmental Laboratory Network

Page 10 of 10

			$\sim$	CHAIN OF CUSTODY RECORD	OF CU	STOI	YE	EC	ORI						•
ES	WSDOT WSDOT										_	-	\		
Contact: Ingrid Wertz Tel: 206.633.4486	Contact: Naomi Chechowitz Tel: 206.440.4602	omi Checho ).4602	witz						Proje	Page: Project ID:	30,35	of 1	(101 thich	ch.	Sknoberd
Laboratory: North Creek Analytical Contact: Amar Gill	alytical	g _ 4	Contact: Di	University of Washington Contact: David Stensel	ä			Date	Case File #: Date recorded by:	Case File #: ecorded by:					turarunt
Tel: 425.420.9232			Tel-206.543-9358	3.9358					Апа	lysis R	nalysis Required				
		-\	\						$\dashv$						<u></u>
SR405 Vortechs TM Monitoring Project	ortechs	IOM MT	nitorin	g Proje	ct	<u></u>			Zn				<u>-</u>		
						77.					-P		7 9	?	
Sample ID	Date Collected	Time * Collected	Comp? Gra	Time # of Collected Comp? Grab? contain.	В	TSS	Turbi Hardr	Total	Disso	TP	Ortho	ABD	Other	Other	Notes
NI -10+1149-701	11/11/101	12/02	<		٤	Ź	Z	7	1	1	7		7		
100-106120-70A	4/17/01	1:21 100	7	_	٤	7	7	1	7	7	1		7		
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							$\vdash$		$\sqcap$						
Comments/Special Notes:			Relinquished by:	d by: /n.	ļ			Rel	inquis	Relinquished by:					
# Time last subsample :	Compisite,		Signature	loned We				Sig	Signature						
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		<del></del>		Ι.											
		-r	Received by:	10-10h	SAD			: E	Received by:	by:					
		- 1 - 1	Drinted Name	- 11	`	9	.	<u> </u>	Drinted Name						
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SAMPLES WERE NOAppindix B- field sheets.xls, CoC - SR405
2-6C UPON RECEIOT

Taylor Associates 3/23/01

## Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz

**Taylor Associates** Tel: 206.633.4486 Analysis Performed by: Lynel Rabago, Joyce Chang University of Washington Department of Civil Engineering Contact: Dr. David Stensel Tel: 206.543.9358

Volume Cumumitée

Project ID:

SR 405 - Vortechs

Sample ID:

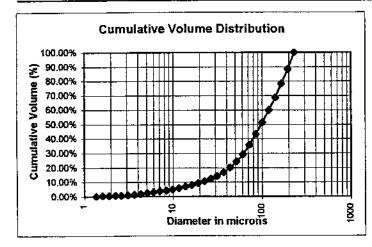
VOR-041701-IN

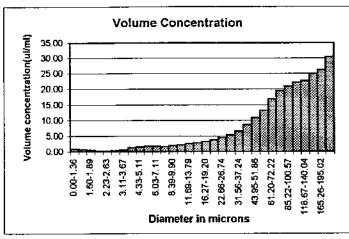
Date and Time Collected:

4/17/01 1:21am 4/19/01

Date and Time of PSD Analysis:

8:34am





Range	Concentration	Volume	
(microns)	(4#71)	(%)	(mg)
0.00-1.36	0.86	0.33%	0.13
1.36-1.60	0,68	0.59%	0.10
1.60-1.89	0.47	0.78%	0.07
1.89-2.23	0.31	0.90%	0.05
2.23-2.63	0.24	0.99%	0.04
2.63-3.11	0.31	1.11%	0.05
3.11-3.67	0.66	1.36%	0.10
3.67-4.33	1.23	1.83%	0.18
4.33-5.11	1.48	2.41%	0.22
5,11-6.03	1.71	3.06%	0.25
6.03-7.11	1.67	3.71%	0.25
7.11-8.39	1.57	4.31%	0.23
8.39-9.90	1.83	5.02%	0.27
9.90-11.69	2.14	5.84%	0.32
11.69-13.79	2.62	6.85%	0.39
13.79-16.27	2.77	7.92%	0.41
15.27-19.20	3.22	9.16%	0.47
19.20-22.66	3.69	10.58%	0.54
22.66-26.74		12.29%	0.65
26.74-31.56	5.26	14.31%	0.77
31.56-37.24	6.57	16.84%	0.97
37,24-43.95	8.60	20.15%	
43.95-51.86	10.81	24.32%	1.59
51.86-61.20	13.18	29.39%	1.94
61.20-72.22	16.87	35.89%	2,48
72.22-85.22	19.49	43.40%	2.87
85.22-100.57	20.83	51.42%	3.06
100.57-118.67	22.09	59.92%	3.25
118.67-140.04	22.65	68.64%	3.33
140.04-165.26	24.91	78.24%	3.66
165.26-195.02	26.12	88.30%	3.84
195.02-230.14	30.40	100.00%	4.47
Total	259.69		38.20

% Mass

79.75%

11.90%

3.13%

5.22%

100.00%

Mass of TS8

(mg)

38.20

5.70

1.50

2.50

47.90

Size Hange

(microna)

< 212

212-425

425-850

>850

Total

Computed Statistics:

Weight Mean = 113.88 microns

19.20 microns  $D_{50} = 85.22 \text{ microns}$ 

 $D_{90} = 195.02 \text{ microns}$ 

Volume of Sample:

400 ml

Volume of Dilution:

0 ml added

Comments: The 48-hour holding time was not met. VSS was not measured.

# Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz Taylor Associates

Tel: 206.633.4486

Analysis Performed by: Lynel Rabago, Joyce Chang University of Washington Department of Civil Engineering Contact: Dr. David Stensel

Plantaries Mass

Tel: 206.543.9358

Project ID:

SR 405 - Vortechs

Sample ID:

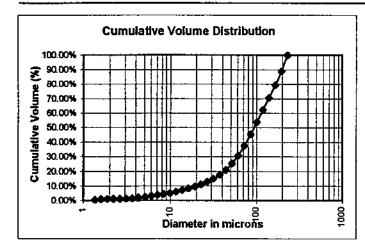
VOR-041701-OUT

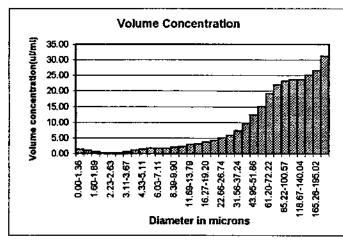
Date and Time Collected:

4/17/01 1:21am

Date and Time of PSD Analysis:

4/19/01 10:08am





Company   Company   Company   Company	Range	Concentration	Volume	
1.36-1.60         0.95         0.81%         0.12           1.60-1.89         0.58         1.02%         0.08           1.89-2.23         0.33         1.13%         0.04           2.23-2.63         0.22         1.21%         0.03           2.63-3.11         0.27         1.31%         0.04           3.11-3.67         0.62         1.53%         0.08           3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67 <th>(microns)</th> <th>(u)/1)</th> <th>(%)</th> <th>(mg)</th>	(microns)	(u)/1)	(%)	(mg)
1.60-1.89         0.58         1.02%         0.08           1.89-2.23         0.33         1.13%         0.04           2.23-2.63         0.22         1.21%         0.03           2.63-3.11         0.27         1.31%         0.04           3.11-3.67         0.62         1.53%         0.08           3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78		1.33	0.47%	0.17
1.89-2.23         0.33         1.13%         0.04           2.23-2.63         0.22         1.21%         0.03           2.63-3.11         0.27         1.31%         0.04           3.11-3.67         0.62         1.53%         0.08           3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97			0.81%	0.12
2.23-2.63         0.22         1.21%         0.03           2.63-3.11         0.27         1.31%         0.04           3.11-3.67         0.62         1.53%         0.08           3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62 </td <td></td> <td>0.58</td> <td>1.02%</td> <td>0.08</td>		0.58	1.02%	0.08
2.63-3.11         0.27         1.31%         0.04           3.11-3.67         0.62         1.53%         0.08           3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.		0.33	1.13%	0.04
3.11-3.67         0.62         1.53%         0.08           3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%	2.23-2.63		1.21%	0.03
3.67-4.33         1.16         1.94%         0.15           4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%	2.63-3.11	0.27	1.31%	0.04
4.33-5.11         1.42         2.45%         0.19           5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%			1.53%	0.08
5.11-6.03         1.80         3.09%         0.24           6.03-7.11         1.82         3.73%         0.24           7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%		1,16	1.94%	0.15
6.03-7.11 1.82 3.73% 0.24 7.11-8.39 1.78 4.37% 0.23 8.39-9.90 2.06 5.10% 0.27 9.90-11.69 2.42 5.96% 0.32 11.69-13.79 2.99 7.02% 0.39 13.79-16.27 3.22 8.16% 0.42 16.27-19.20 3.77 9.50% 0.49 19.20-22.66 4.30 11.03% 0.56 22.66-26.74 5.11 12.85% 0.67 26.74-31.56 5.95 14.96% 0.78 31.56-37.24 7.42 17.60% 0.97 37.24-43.95 9.70 21.05% 1.27 43.95-51.86 12.32 25.43% 1.62 51.86-61.20 15.02 30.77% 1.97 61.20-72.22 19.26 37.62% 2.53 72.22-85.22 22.05 45.46% 2.89 85.22-100.57 23.77 53.70% 3.04 100.57-118.67 23.72 62.13% 3.11 118.67-140.04 23.68 70.55% 3.11 140.04-165.26 25.12 79.49% 3.30 165.26-195.02 26.54 88.93% 3.48			2,45%	0,19
7.11-8.39         1.78         4.37%         0.23           8.39-9.90         2.06         5.10%         0.27           9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           140.04-165.26         25.12 <td< td=""><td></td><td></td><td>3.09%</td><td>0.24</td></td<>			3.09%	0.24
8.39-9.90 2.06 5.10% 0.27 9.90-11.69 2.42 5.96% 0.32 11.69-13.79 2.99 7.02% 0.39 13.79-16.27 3.22 8.16% 0.42 16.27-19.20 3.77 9.50% 0.49 19.20-22.66 4.30 11.03% 0.56 22.66-26.74 5.11 12.85% 0.67 26.74-31.56 5.95 14.96% 0.78 31.56-37.24 7.42 17.60% 0.97 37.24-43.95 9.70 21.05% 1.27 43.95-51.86 12.32 25.43% 1.62 51.86-61.20 15.02 30.77% 1.97 61.20-72.22 19.26 37.62% 2.53 72.22-85.22 22.05 45.46% 2.89 85.22-100.57 23.17 53.70% 3.04 100.57-118.67 23.72 62.13% 3.11 118.67-140.04 23.68 70.55% 3.11 140.04-165.26 25.12 79.49% 3.30 165.26-195.02 26.54 88.93% 3.48		1.82		0.24
9.90-11.69         2.42         5.96%         0.32           11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14		1.78	4.37%	0.23
11.69-13.79         2.99         7.02%         0.39           13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           118.67-140.04         23.68         70.55%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14		2.06	5.10%	0.27
13.79-16.27         3.22         8.16%         0.42           16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           118.67-140.04         23.68         70.55%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09		2.42	5.96%	0.32
16.27-19.20         3.77         9.50%         0.49           19.20-22.66         4.30         11.03%         0.56           22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09		2.99	7.02%	0.39
19.20-22.66 4.30 11.03% 0.56 22.66-26.74 5.11 12.85% 0.67 26.74-31.56 5.95 14.96% 0.78 31.56-37.24 7.42 17.60% 0.97 37.24-43.95 9.70 21.05% 1.27 43.95-51.86 12.32 25.43% 1.62 51.86-61.20 15.02 30.77% 1.97 61.20-72.22 19.26 37.62% 2.53 72.22-85.22 22.05 45.46% 2.89 85.22-100.57 23.17 53.70% 3.04 100.57-118.67 23.72 62.13% 3.11 118.67-140.04 23.68 70.55% 3.11 140.04-165.26 25.12 79.49% 3.30 165.26-195.02 26.54 88.93% 3.48				0.42
22.66-26.74         5.11         12.85%         0.67           26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09			-10010	0.49
26.74-31.56         5.95         14.96%         0.78           31.56-37.24         7.42         17.60%         0.97           37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09		4.30	11.03%	0.56
31.56-37.24 7.42 17.60% 0.97 37.24-43.95 9.70 21.05% 1.27 43.95-51.86 12.32 25.43% 1.62 51.86-61.20 15.02 30.77% 1.97 61.20-72.22 19.26 37.62% 2.53 72.22-85.22 22.05 45.46% 2.89 85.22-100.57 23.17 53.70% 3.04 100.57-118.67 23.72 62.13% 3.11 118.67-140.04 23.68 70.55% 3.11 140.04-165.26 25.12 79.49% 3.30 165.26-195.02 26.54 88.93% 3.48 195.02-230.14 31.14 100.00% 4.09			12.85%	0.67
37.24-43.95         9.70         21.05%         1.27           43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           118.67-140.04         23.68         70.55%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09			14.96%	0.78
43.95-51.86         12.32         25.43%         1.62           51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           118.67-140.04         23.68         70.55%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09			17.60%	
51.86-61.20         15.02         30.77%         1.97           61.20-72.22         19.26         37.62%         2.53           72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           118.67-140.04         23.68         70.55%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09	37.24-43.95		21.05%	1.27
61.20-72.22 19.26 37.62% 2.53 72.22-85.22 22.05 45.46% 2.89 85.22-100.57 23.17 53.70% 3.04 100.57-118.67 23.72 62.13% 3.11 118.67-140.04 23.68 70.55% 3.11 140.04-165.26 25.12 79.49% 3.30 165.26-195.02 26.54 88.93% 3.48 195.02-230.14 31.14 100.00% 4.09	43.95-51.86	12.32	25.43%	1.62
72.22-85.22         22.05         45.46%         2.89           85.22-100.57         23.17         53.70%         3.04           100.57-118.67         23.72         62.13%         3.11           118.67-140.04         23.68         70.55%         3.11           140.04-165.26         25.12         79.49%         3.30           165.26-195.02         26.54         88.93%         3.48           195.02-230.14         31.14         100.00%         4.09	51.86-61.20	15.02	30.77%	1.97
85.22-100.57     23.17     53.70%     3.04       100.57-118.67     23.72     62.13%     3.11       118.67-140.04     23.68     70.55%     3.11       140.04-165.26     25.12     79.49%     3.30       165.26-195.02     26.54     88.93%     3.48       195.02-230.14     31.14     100.00%     4.09	61.20-72.22	19.26	37.62%	2.53
100.57-118.67     23.72     62.13%     3.11       118.67-140.04     23.68     70.55%     3.11       140.04-165.26     25.12     79.49%     3.30       165.26-195.02     26.54     88.93%     3.48       195.02-230.14     31.14     100.00%     4.09	72.22-85.22	22,05	45.46%	2.89
118.67-140.04     23.68     70.55%     3.11       140.04-165.26     25.12     79.49%     3.30       165.26-195.02     26.54     88.93%     3.48       195.02-230.14     31.14     100.00%     4.09	85.22-100.57	23.17	53.70%	3.04
140.04-165.26     25.12     79.49%     3.30       165.26-195.02     26.54     88.93%     3.48       195.02-230.14     31.14     100.00%     4.09	100.57-118.67	23.72	62.13%	3.11
165.26-195.02 26.54 88.93% 3.48 195.02-230.14 31.14 100.00% 4.09	118.67-140.04	23.68	70.55%	3.11
195.02-230.14 31.14 100.00% 4.09	140.04-165.26	25.12	79.49%	3.30
			88.93%	3.48
Total 281.22 36.90	195.02-230.14	31.14	100.00%	4.09
	Total	281.22		36.90

Computed Statistics:

Weight Mean = 110.88 microns

D<sub>10</sub> = 19.20 microns

D<sub>50</sub> = 85.22 microns

 $D_{90} = 195.02 \text{ microns}$ 

Volume of Sample:

420 ml

Volume of Dilution:

0 ml addeđ

Comments: The 48-hour holding time was not met. VSS was not measured.

Size Range

(MECFORE

< 212

212-425

425-850

>850

Total

Mass of 155

(ffeg)

36.90

3.70

2.30

1.40

44.30

**\* Mass** 

83.30%

8.35%

5.19%

3.16%

100.00%

Time? reset (Y/N)? Time downloaded  Time? reset (Y/N)? Time downloaded  Time downloaded  Time downloaded  Total Flow (cfs)  Total Flow (cf)  Sig/Spec str.  Time downloaded  Pre-Storm Visit  OUTLET  attery (V) lean bottle (Y/N)? lean bottle (Y/N)? Pump tubing ok (Y/N)? Replaced? Ampler rubing ok (Y/N)? Replaced?  Ampler rubing ok (Y/N)? Changed?  It. desiccant ok (Y/N)? Changed? Att. desiccant ok (Y/N)? Changed?  It. desiccant ok (Y/N)?  It. desiccant	,	Bre-Stro	m Visit- or - Post-Storm Vi	sit (circle	one)	
Time? reset (Y/N)? Time downloaded  Time? reset (Y/N)? Time downloaded  Time? reset (Y/N)? Time downloaded  Velocity (fts) Flow (cfs) Flow (cfs) Sig/Spec str. Time downloaded  Pre-Storm Visit  OUTLET  Battery (V) Clean bottle (Y/N)? Pump tubing ok (Y/N)? Replaced? Sampler tubing ok (Y/N)? Replaced? Sampler tubing ok (Y/N)? Changed? Fix. desiccant ok (Y/N)? Changed? Measure Dn level? Ok? Sampler tubing ok (Y/N)? Changed? Measure Dn level? Ok? Sampler tubing ok (Y/N)? Changed? Measure Dn level? Ok? Sampler Volume (ml) Smpect Rain Gage  Fost - Storm Visit  NULET  Equipment Ran Completely? Sampler Enabled (date/time)? Composite Began (date/time)? Number of subsamples taken? Any subsample collection errors? Last Sample Volume Collected (ml) Sample ID?  YN Value Storm Validation Criteria hrs. (if known) Was there an antecedent dry period of at least six hours? in. Was total rainfall greater than or equal to 0.25"? hrs. Was runoff duration greater than on hour?  # subsamples total volume of the istorm sampled? # subsamples total volume of the istorm sampled? # subsamples total volume of the istorm sampled? # subsamples total volume of the iniet?		INLET			<b>OUTLET</b>	
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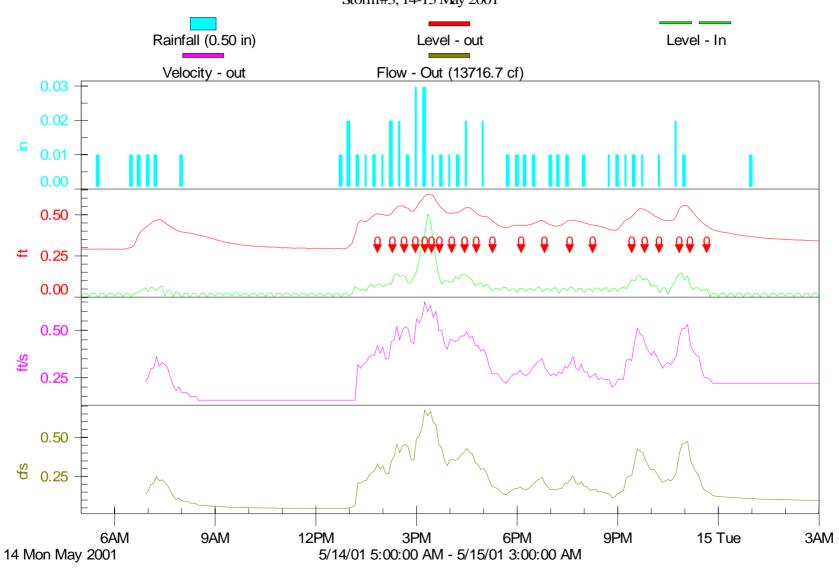
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NOTES (including any problems with	equipment or maintenance	activities performed):	

# STORM EVENT NUMBER 3

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•		

# SR 405 Vortechnics

Storm#3, 14-15 May 2001



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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

425.420.9200 fax 425.420.9210

Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9290 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

#### PROJECT NARRATIVE for B1E0386

Client: Taylor Associates Project Manager: Ingrid Wertz Project Name: SR405 Vortechs Project Number: Not Provided

#### 1.0 DESCRIPTION OF CASE

Two water sample were received for the analysis of:

- Total Zinc by EPA 200.8
- Dissolved Zinc by EPA 200.8
- Hardness by SM2340B
- Orthophosphate by EPA 365.2
- Total Phosphorous by EPA 365.2
- Total Suspended Solids by EPA 160.2
- Turbidity
- PH by EPA 150.1

#### 2.0 COMMENTS ON SAMPLE RECEIPT

The samples were received in 5L Poly bottles then split into the appropriate sample container upon receipt then logged in on  $15^{th}$  May 2001 at a temperature of 17.9C. The samples were received outside the recommended temperature range of  $4C \pm 2C$ .

#### Preparation and Analysis

The dissolved metals were filtered in house and preserved with Nitric Acid. All analyses and batch QA were within method established criteria except for the Matrix Spike and Matrix Spike Duplicate for the Total Zinc analysis batch. Since this was due to a matrix effect and the Blank and Blank Spike recovery were within method established limits this does not represent an out-of-control condition for the analytical batch.

"I certify that this data package is in compliance with the Contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature."

Project Manager

North Creek Analytical



 Seattle
 11720 North Creek Pkwy N, Suite 400, Botheil, WA 98011-8244

 425,426,9200
 fax 425,420,9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

 509,924,9200
 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, Off 97008-7132

503.906.9290 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VOR-051401-IN	B1E0386-01	Water	05/14/01 23:38	05/15/01 14:40
VOR-051401-OUT	B1E0386-02	Water	05/14/01 23:39	05/15/01 14:40
VOR-051401-FB	B1E0386-03	Water	05/15/01 13:00	05/15/01 14:40

'orth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 

Page 1 of 10



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 425.420.9200 fax 425.420.9210

Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200 fax 509.924.9290

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503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541 383,9310 fax 541,382,7588

Taylor Associates

Seattle WA, 98103

3917 Ashworth Ave North

Project: SR405 Vortechs

Project Number: Not Provided

Reported:

Project Manager: Ingrid Wertz

05/30/01 17:23

# Total Metals by EPA 200 Series Methods North Creek Analytical - Bothell

		Reporting	**	75.91	35 . 1				
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-051401-IN (B1E0386-01) Water	Sampled: 05/	14/01 23:38	Receive	d: 05/15/01	14:40				
Zinc	0.0812	0.0100	mg/l	]	JE17017	05/17/01	05/21/01	EPA 200.8	
VOR-051401-OUT (B1E0386-02) Water	Sampled:	05/14/01 23:3	9 Recei	ved: 05/15/0	1 14:40				
Zinc	0.0733	0.0100	mg/l	1	1E17017	05/17/01	05/21/01	EPA 200.8	
VOR-051401-FB (B1E0386-03) Water	Sampled: 05	/15/01 13:00	Receive	d: 05/15/01	14:40				
Zinc	ND	0.0100	mg/l	1	1E17017	05/17/01	05/21/01	EPA 200.8	-

Torth Creek Analytical - Bothell

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Gill, Project Manager



503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported:

05/30/01 17:23

# Dissolved Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-051401-IN (B1E0386-01) Water	Sampled: 05	/14/01 23:38	Receive	d: 05/15/01	14:40	•			
Zinc	0.0397	0.0100	mg/l	1	1E21029	05/21/01	05/21/01	EPA 200.8	
VOR-051401-OUT (B1E0386-02) Wate	r Sampled:	05/14/01 23:3	9 Recei	ved: 05/15/0	1 14:40				
Zinc	0.0400	0.0100	mg/l	1	1E21029	05/21/01	05/21/01	EPA 200.8	
VOR-051401-FB (B1E0386-03) Water	Sampled: 05	/15/01 13:00	Receive	d: 05/15/01	14:40				
Zinc	ND	0.0100	mg/l	1	1E21029	05/21/01	05/21/01	EPA 200.8	



 Seattle
 11720 North Creek Pkwy N, Suite 400, Bothell, WA 96011-8244

 425,420,9200
 fax 425,420,9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

 509,924,9200
 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, QR 97701-5711 541.383.9310 fax 541.382.7568

Taylor Associates

Project: SR405 Vortechs

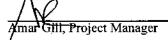
3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

# Conventional Chemistry Parameters by APHA/EPA Methods North Creek Analytical - Bothell

		Reporting							
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-051401-IN (B1E0386-01) Water	Sampled: 05	5/14/01 23:38	Received:	05/15/01	14:40				
Hardness	27.3	1.00mg	g eq. CaCO3/L	. 1	1E25034	05/25/01	05/30/01	SM 2340B	
Orthophosphate-phosphorus	0.00375	0.00200	mg/i	п	1E17009	05/16/01	05/16/01	EPA 365.2	
Phosphorus	0.0742	0.00500		Ħ	1E22021	05/22/01	05/23/01	<b>H</b>	
pHi	7.01		pH Units	ħ	IE16039	05/15/01	05/15/01	EPA 150.1	
Total Suspended Solids	55	4.0	mg/l	14	1E18013	05/16/01	05/18/01	EPA 160.2	
Turbidity	37.6	1.00	NTU	14	JE16040	05/15/01	05/15/01	EPA 180.1	
VOR-051401-OUT (B1E0386-02) Wate	г Sampled:	05/14/01 23:	39 Receive	d: 05/15/0	14:40				
Hardness	27.9	1.00mg	g eg. CaCO3/L	. 1	1E25034	05/25/01	05/30/01	SM 2340B	
Orthophosphate-phosphorus	0.00349	0.00200	mg/l	a	1E17009	05/16/01	05/16/01	EPA 365.2	
Phosphorus	0.0892	0.00500	н	11	1E22021	05/22/01	05/23/01	lF .	
pH	6.86		pH Units	31	1E16039	05/15/01	05/15/01	EPA 150.1	
Total Suspended Solids	44	4.0	mg/l	7 "	1E18013	05/16/01	05/18/01	EPA 160.2	
Turbidity	<b>57.6</b> $<$	2.00	NTU	, <b>2</b>	1E16040	05/15/01	05/15/01	EPA 180.1	
OR-051401-FB (B1E0386-03) Water	Sampled: 0	5/1 <del>5/01-13:</del> 00	Received:	05/15/01	14:40				
Hardness	ИD	1.00 mg	g eq. CaCO3/L	, j	1E25034	05/25/01	05/30/01	SM 2340B	
Orthophosphate-phosphorus	0.00429	0.00200	mg/l	и	1E17009	05/16/01	05/16/01	EPA 365.2	
Phosphorus	ND	0.00500	н	II	1E22021	05/22/01	05/23/01		
pH	5.55		pH Units	II	1E16039	05/15/01	05/15/01	EPA 150.1	
Total Suspended Solids	ND	4.0	mg/l	n	3E18013	05/16/01	05/18/01	EPA 160.2	
Turbidity	ND	1.00	NTU	н	IE16040	05/15/01	05/15/01	EPA 180.1	





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 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9290

 Portland
 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200

 fax 503.906.9210
 Bend 20332 Empire Avenue, Suite F-1, Band, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

## Total Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1E17017:	Prepared 05/17/01	Using El	PA 200 Sei	ries							
Blank (1E17017-B)	LKI)			.,,						. <u></u>	
Zinc	<del></del>	ND	0.0100	mg/l							
LCS (1E17017-BS)	1)										
Zinc		0.208	0.0100	mg/l	0.200		104	85-115			
Matrix Spike (1E1	7017-MS1)					Source: 1	B1E0294-	01			
Zinc		1.94	0.100	mg/I	0.200	1.57	185	75-125			Q-1:
Matrix Spike Dup	(1E17017-MSD1)					Source: 1	B1E0294-	01			
Zinc		1.90	0.100	mg/l	0.200	1.57	165	75-125	2.08	20	Q-1:



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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

**Taylor Associates** 

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

# Dissolved Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1E21029:	Prepared 05/21/01	Using El	PA 3005A								
Blank (1E21029-Bl	LK1)										
Zinc		ND	0.0100	mg/l							
LCS (1E21029-BS1	1)										
Zinc		0.201	0.0100	mg∕l	0.200		100	85-115			
Matrix Spike (1E2)	1029-MS1)					Source: I	31E0216-	97			
Zinc		0.187	0.0100	mg/l	0.200	ND	91.8	75-125			
Matrix Spike Dup	(1E21029-MSD1)					Source: E	31E0216-	07			
Zinc	<del></del>	0.191	0.0100	mg/]	0.200	ND	93.8	75-125	2.12	20	

'orth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager



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 425-420,9200
 fax 425-420,9210

 Spokane
 East 11115 Montgomery, Suite 3, Spokane, WA 99206-4776

 509,924,9200
 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

	<u></u>		Reporting	<u></u>	Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1E16039:	Prepared 05/15/01	Using G	eneral Pre	paration		•					_
Duplicate (1E16039	-DUP1)					Source: I	B1E0376-	01			
pН		6.25		pH Units		6.29			0.638	10	
Batch 1E16040:	Prepared 05/15/01	Using G	eneral Pre	paration							
Blank (1E16040-BL	.K1)		•		_						
Turbidity		ND	1.00	NTU							
LCS (1E16040-B\$1	)										
Turbidity	<del></del>	21.5	1.00	NTU	20.0		108	90-110		·	
Duplicate (1E16040	-DUP1)					Source: E	31E0386-0	03			
Turbidity	<u></u>	ND	1,90	NTU		ND			32.0	20	
Batch 1E17009:	Prepared 05/16/01	Using G	eneral Pre	paration							
tank (1E17009-BL	.K1)								-		
Orthophosphate-phospl	norus	ND	0.00200	mg/l							
LCS (1E17009-BS1)	)										
Orthophosphate-phosph	iorus	0.0498	0.00200	mg/l	0.0500		99.6	90-110			
Matrix Spike (1E17	009-MS1)					Source: E	31E0398-0	)3			
Orthophosphate-phosph	norus	0.0628	0.00200	mg/l	0.0500	10101	105	80-120			·.
Matrix Spike Dup (	1E17009-MSD1)					Source: E	HE0398-0	)3			
Orthophosphate-phosph	IOTUS	0.0634	0.00200	mg/l	0.0500	0.0101	107	80-120	0.951	25	

'orth Creek Analytical - Bothell

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Amar Gill, Project Manager



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509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Resuit	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1E18013:	Prepared 05/16/01	Using G	eneral Prep	paration							
Blank (1E18013-B	LK1)										
Total Suspended Solid	ls	ND	4.0	mg/J							
Duplicate (1E1801)	3-DUP1)					Source: E	31E0384-	01			
Total Suspended Solid	ls .	17	4.0	mg/l		16			6.1	19	
Batch 1E22021:	Prepared 05/22/01	Using G	eneral Prep	paration							
Blank (1E22021-B)	LK1)				<u> </u>						
Phosphorus		ND	0.00500	mg/l							
LCS (1E22021-BS)	1)										
Phosphorus		0.0501	0.00500	mg/l	0.0500		100	90-120			
LCS Dup (1E2202)	I-BSD1)										
osphorus		0.0518	0.00500	mg/l	0.0500		104	90-120	3.34	20	
Matrix Spike (1E2)	2021-MS1)					Source: E	31E0398-	10			
Phosphorus		0.0572	0.00500	mg/l	0.0500	0.0153	83.8	60-139	·		
Matrix Spike Dup	(1E22021-MSD1)					Source: E	31E0398-	10			
Phosphorus		0.0603	0.00500	mg/ł	0.0500	0.0153	90.0	60-139	5.28	25	
Batch 1E25034:	Prepared 05/25/01	Using E	PA 3010A								
Blank (1E25034-Bl	LKI)										
Hardness	·-····································	ND	1.00mg	eq. CaCO3/I	Ľ						

'orth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 

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 fax 425,420,9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509,924,9200
 fax 509,924,9290

 Partland
 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

Spokane

Portland

503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, DR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates

Project: SR405 Vortechs

3917 Ashworth Ave North Seattle WA, 98103

Project Number: Not Provided Project Manager: Ingrid Wertz

Reported: 05/30/01 17:23

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

Analyte		Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1E25034:	Prepared 05/25/01	Using E	PA 3010A						·		
LCS (1E25034-BS1)	)										
Hardness		69.6	1.00mg	g eq. CaCO3/L	66.2		105	70-130	-		
Matrix Spike (1E25	034-MS1)					Source: I	B1E0531-	06			
Hardness		106	1.00mg	g eq. CaCO3/L	66.2	38.7	102	75-125			
Matrix Spike Dup (	1E25034-MSD1)					Source: 1	B1E0531-	06			
Hardness		112	1.00mg	g eq. CaCO3/L	66.2	38.7	111	75-125	5.50	20	

'orth Creek Analytical - Bothell

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Amar Gill, Project Manager



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Spokane

9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, DR 97701-5711 541,383,93101 fax 541,382,7588

Project: SR405 Vortechs Taylor Associates Project Number: Not Provided 3917 Ashworth Ave North

Project Manager: Ingrid Wertz Seattle WA, 98103

Reported: 05/30/01 17:23

#### Notes and Definitions

Analyses are not controlled on matrix spike RPD and/or percent recoveries when the sample concentration is significantly higher Q-15

than the spike level.

Analyte DETECTED DET

NDAnalyte NOT DETECTED at or above the reporting limit

NR Not Reported

Sample results reported on a dry weight basis dry

Relative Percent Difference RPD

mar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 

Page 10 of 10

Sample Collection by: Client: TAYLOR ASSOCIATES WSDOT Contact: Ingrid Wertz Contact: Naomi Chechowitz Tel: 206.633.4486 Tel: 206.440.4602  Laberatory: North Creek Analytical Contact: Amar Gill Tel: 425.420.9232  Tel: 425.420.9232  Tel: 425.420.9232  Tine **  Sample ID  Vok - Ø\$ 1940 - OUT  Vok - Ø\$ 1940 - OUT  Sample ID  Sample	Client: WSDOT Contact: Naomi Chechowitz Tel: 206.440.4602  adytical or Univ Cont Cont Tel:  Date Time  Collected Collected Com S)14101 23:38 S14101 23:38 S14101 23:39 S151601 13:50	CH omi Chechowitz ).4602  or University of W Contact: David Tel: 206.543.9; Time + Collected Comp? Grab? 23:38 23:33 V3:50	CHAIN ( University of Washingto Contact: David Stensel Tel: 206.543.9358  mitoring Proje  # of Comp? Grab? contain 3 3 3 3 3	CH CH CH CH	CHAIN OF CUSTODY RECO  Contract: David Stensel  Tel: 206.543.9358  Tel: 206.543.9358  Total Zn  Total Zn  Total Zn  Total Zn  Total Zn  Total Zn	F CU	TSS	Turbidity	T Hardness	Total Zn	Dissolved Zn Ana CCase Project R	Total Zn  Dissolved Zn  Project ID:  Case File #:  TP  TP  Page:		d kchs of	Other? H	Other?		Sknown Notes  BIE0366-N -03
SR405 V	Ortechs  Date Collected	Time + Collected	nitori	ng]	Projec	matrix	TSS	Turbidity	Hardness	Total Zn	Dissolved Zn	TP	Ortho-P		Other? H	Other?		Notes
Sample ID	1	Collected	Comp?	3rab?	contain.	matrix ک	TS	ς Tu	Ha	CTο	Di	TF	V Or	PE,		Ot		Notes 14/1386-11
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Taylor Associates 3/23/01

4 p. 6. El

# Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz Taylor Associates

Tel: 206.633.4486

Analysis Performed by: Lynel Rabago University of Washington Department of Civil Engineering Contact: Dr. David Stensel Tel: 206.543.9358

Project ID: Sample ID: SR405 - Vortechs VOR-051401-IN

Date and Time Collected:

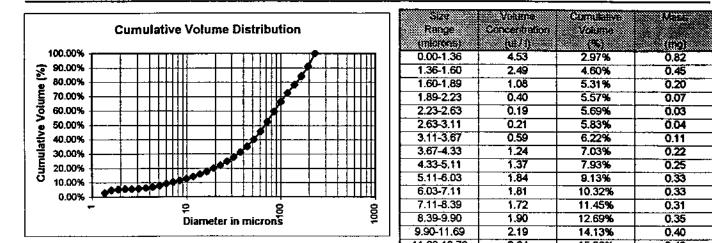
5/14/01

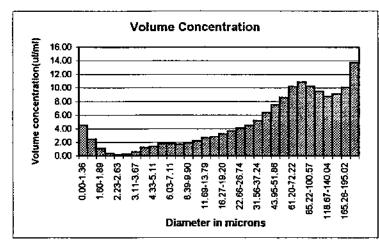
11:38pm

Date and Time of PSD Analysis:

5/16/01

10:52am





5/28	Volume	Cumulative	Vesti
Range	Concentration	Volume	
(microns)	(487)		(110)
0.00-1.36	4.53	2.97%	0.82
1.36-1.60	2.49	4.60%	0.45
1.60-1,89	1.08	5.31%	0.20
1.89-2.23	0.40	5.57%	0.07
2.23-2.63	0.19	5.69%	0.03
2.63-3.11	0.21	5.83%	0.04
3.11-3.67	0.59	6.22%	0.11
3.67-4.33	1.24	7.03%	0.22
4.33-5.11	1.37	7.93%	0.25
5.11-6.03	1.84	9.13%	0.33
6.03-7.11	1.81	10.32%	0.33
7.11-8.39	1.72	11.45%	0.31
8.39-9.90	1.90	12.69%	0.35
9.90-11.69	2.19	14.13%	0.40
11.69-13.79	2.64	15.86%	0.48
13.79-16.27	2.79	17.69%	0.51
16.27-19.20	3.23	19.81%	0.59
19.20-22.66	3.65	22.21%	0.66
22.66-26.74	4.07	24.87%	0.74
26.74-31.56	4.49	27.82%	0.81
31,56-37.24	5.19	31.22%	0.94
37,24-43.95	6.35	35.38%	1.15
43,95-51.86	7.49	40.30%	1.36
51.86-61.20	8.58	45.92%	1.56
61.20-72.22	10.21	52.62%	1.85
72.22-85.22	10.85	59.73%	1.97
85.22-100.57	10.25	66.45%	1.86
100.57-118.67	9.50	72.68%	1.72
118.67-140.04	8.72	78.40%	1.58
140.04-165.26	9.11	84.37%	1.65
165.26-195.02	10.11	91.00%	1.84
195.02-230.14	13.73	100.00%	2.49
Total	152.51		27.70

**Computed Statistics:** 

Weight Mean = 89.51 microns

 $D_{10} =$ 6.03 microns 61.20 microns

 $D_{90} = 165.26 \text{ microns}$ 

Volume of Sample:

600 ml

Volume of Dilution:

0 ml added

Comments: The 48-hour holding time was met.

Size Range (microns)	Mass of TSS (mg)	% Mass TSS	Mass of VSS	% Mass
< 212	27.70	94.86%	10.30	48,58%
212-425	0.80	2.74%	1.40	6.60%
425-850	0.40	1.37%	2.40	11.32%
>850	0.30	1.03%	7.10	33.49%
Total	29.20	100.00%	21.20	100.00%

#### Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz Taylor Associates Tel: 206,633,4486

Analysis Performed by: Lynel Rabago University of Washington Department of Civil Engineering Contact: Dr. David Stensel Tel: 206.543.9358

Cumulative

Wasa.

Volume

**\*** 

Project ID: Sample ID: SR405 - Vortechs

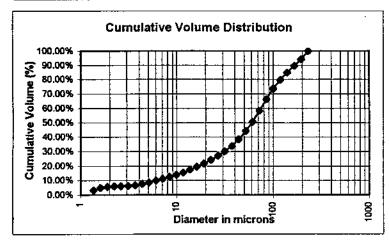
Date & Time Collected:

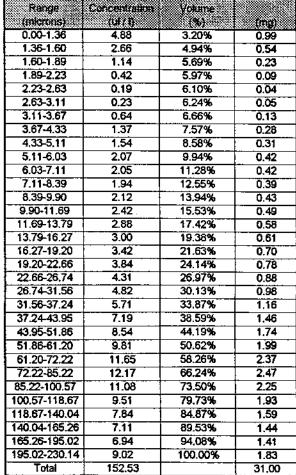
Vor051401out 5/14/01

Date & Time of PSD Analysis:

11:39pm

5/16/01 3:07pm





% Mass

- T38

70.29%

2.95%

1.36%

25.40%

100.00%

Mass of VSS

(mg)

11.60

1.10

1.00

6.40

20.10

Mass of TSS

(mg)

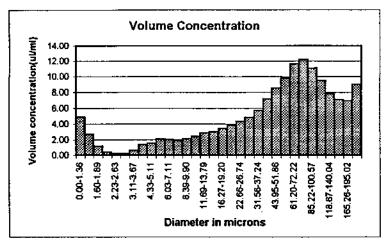
31.00

1.30

0.60

11.20

44.10



Comput	ted S	Statis	tics:

Weight Mean = 78.86 microns

6.03 microns 51.86 microns

165.26 microns

Volume of Sample: Volume of Dilution: 700 mi

0 ml added

Comments: Portable was not recalibrated after IN sample.

Size Range

(microns)

< 212

212-425

425-850

>850

Total

XXXIII

57.71%

5.47%

4.98%

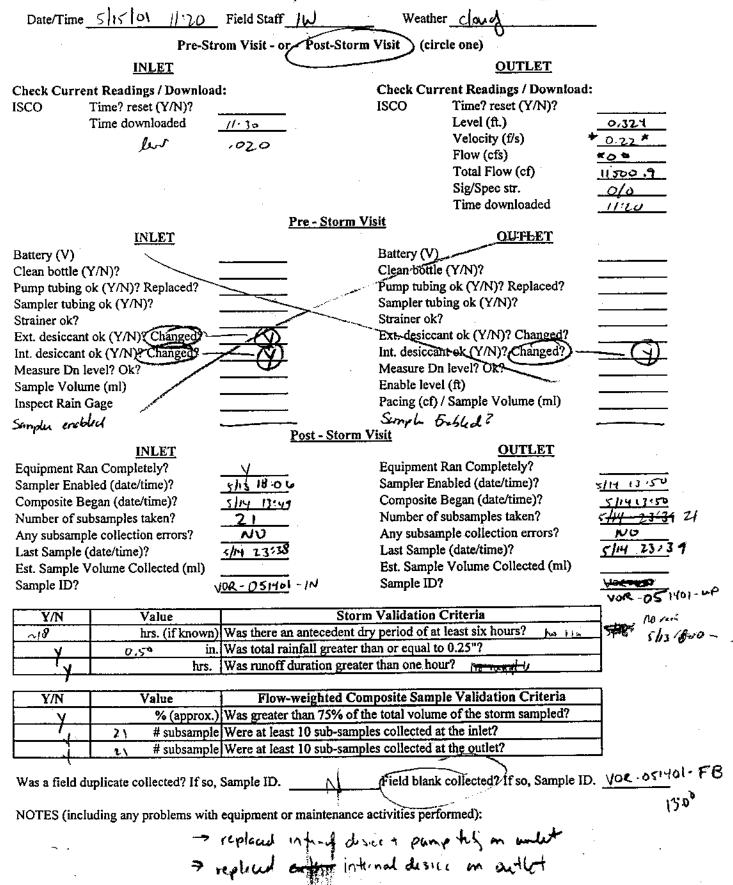
31.84%

100.00%

•	SITE VISIT	SHEET (SR 40	95 Vortechs <sup>TM</sup> Monitoring)	
Date/Time	5/13/4/ 19:00	Field Staff / W	Weather Ovucs	
		om Visit - or Post-S	torm Visit (circle one)	
	INLET		<u>OUTLET</u>	
ISCO	nt Readings / Download Time? reset (Y/N)?	18:03(N)	Check Current Readings / Download ISCO Time? reset (Y/N)?	18:04 (N)
	Time downloaded	.0261	Level (ft.) Velocity (f/s) Flow (cfs) Total Flow (cf) Sig/Spec str.	0.289/
		Pre - Stor	Time downloaded	
Battery (V) Clean bottle (	INLET Y/N)?	12.64 J. W.	Battery (V) Clean bottle (Y/N)?	12.95
-	k (Y/N)? Replaced?	Alma Alm	Pump tubing ok (Y/N)? Replaced? Sampler tubing ok (Y/N)? Strainer ok?	<del></del>
Int. desiccant of Measure Dn le		needs to be Ad	Ext. desiccant ok (Y/N)? Changed? Int. desiccant ok (Y/N)? Changed? Measure Dn level? Ok?	V- chenksoon
Sample Volun	• •	<u> 200 pa</u>	Enable level (ft)	7.5
Inspect Rain C	_		Pacing (cf) / Sample Volume (ml)	4004/2001
Samplu enobl	id	Post - Sto	Somple Bubled?	
	INLET	2000	<u>OUTLET</u>	
	n Completely? led (date/time)?		Equipment Ran Completely? Sampler Enabled (date/time)?	<del></del>
	gan (date/time)?		Composite Began (date/time)?	
•	bsamples taken?	<del></del>	Number of subsamples taken?	·
	e collection errors?		Any subsample collection errors?	
Last Sample (	•		Last Sample (date/time)?	
-	olume Collected (ml)		Est. Sample Volume Collected (ml)	
Sample ID?		<del></del>	Sample ID?	
Y/N	Value	S	torm Validation Criteria	7
			nt dry period of at least six hours?	
	in.		ter than or equal to 0.25"?	
	hrs.	Was runoff duration gr	reater than one hour?	
Y/N	Value	Flow watchts	Composite Comple Validation Cuitania	<del></del> 1
1/1			Composite Sample Validation Criteria of the total volume of the storm sampled?	
<b></b>			amples collected at the inlet?	┥ .
		*	amples collected at the outlet?	7
Was a field du	aplicate collected? If so,		Field blank collected? If so, Sample II	)

NOTES (including any problems with equipment or maintenance activities performed):

# SITE VISIT SHEET (SR 405 Vortechs<sup>TM</sup> Monitoring)

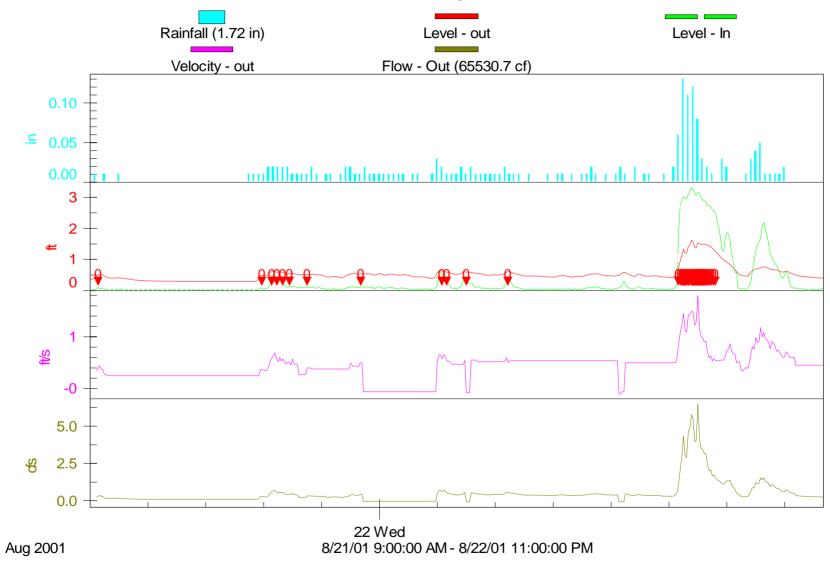


# STORM EVENT

NUMBER 4

# SR 405 Vortechnics

Storm #4, 21-22 August 2001



,		
•		



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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

#### PROJECT NARRATIVE for B1H0531

Client: Taylor Associates

Project Manager: James Packman Project Name: SR405 Vortechs Project Number: Not Provided

#### 1.0 DESCRIPTION OF CASE

Two water sample were received for the analysis of:

- Total Zinc by EPA 200.8
- Dissolved Zinc by EPA 200.8
- Hardness by SM2340B
- Orthophosphate by EPA 365.2
- Total Phosphorous by EPA 365.2
- Total Suspended Solids by EPA 160.2
- Turbidity
- pH by EPA 150.1

#### 2.0 COMMENTS ON SAMPLE RECEIPT

The samples were received and logged in on 23rd August 2001 at a temperature of 15.8C. The samples were received outside the recommended temperature range of  $4C \pm 2C$ .

#### Preparation and Analysis

The dissolved metals were filtered and preserved with Nitric Acid in house prior to analysis. All analyses and batch QA were within method established criteria.

"I certify that this data package is in compliance with the Contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature."

Project Manager

North Creek Analytical



 Seattle
 11720 North Creek Pkwy N, Suite 400, Botheli, WA 98011-8244 425.420.9200
 fax 425.420.9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200
 fax 509.924.9290

 Portland
 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200
 fax 503.906.9210

 Bend
 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 641.928.930, for Ed. 923.7598

Spokane

**Portland** 

541.383.9310 fax 541.382.7588

**Taylor Associates** 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VOR-082201-IN	B1H0531-01	Water	08/22/01 17:25	08/23/01 13:30
VOR-082201-OUT	B1H0531-02	Water	08/22/01 17:24	08/23/01 13:30

North Creek Analytical - Bothell

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North Creek Analytical, Inc. **Environmental Laboratory Network**  Page 1 of 10



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541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

# Total Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
vOR-082201-IN (B1H0531-01) Water	Sampled: 08	/22/01 17:25	Received	d: 08/23/01	13:30				
Zine	0.149	0.0100	mg/l	1	1H27018	08/27/01	08/27/01	EPA 200.8	
/OR-082201-OUT (B1H0531-02) Wate	er Sampled:	08/22/01 17:	24 Recei	ved: 08/23/	01 13:30				
Zinc	0.150	0.0100	mg/l	1	1H27018	08/27/01	08/27/01	EPA 200.8	

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 fax 425.420.9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200
 fax 509.924.9200

Spokage

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

# Dissolved Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-082201-1N (B1H0531-01) Water	Sampled: 08	/22/01 17:25	Received	1: 08/23/01	13:30				Q-30
Zinc	0.0190	0.0100	mg/l	1	1104034	09/04/01	09/05/01	EPA 200.8	
VOR-082201-OUT (B1H0531-02) Wate	r Sampled:	08/22/01 17:	24 Recei	ved: 08/23/	01 13:30				Q-30
Zinc	0.0171	0.0100	mg/l	1	1104034	09/04/01	09/05/01	EPA 200.8	

North Creek Analytical - Bothell

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Portiand 503.924.9290 fax 509.924.9290 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9290 fax 503.906.9210 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

# Conventional Chemistry Parameters by APHA/EPA Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-082201-IN (B1H0531-01) Water	Sampled: 08	3/22/01 17:25	Received:	08/23/01	13:30				
Hardness	50.5	1.00 mg	g eq. CaCO3/L	. 1	1H29021	08/29/01	08/30/01	SM 2340B	
Orthophosphate-phosphorus	0.0421	0.00200	mg/l	#	1H25010	08/23/01	08/23/01	EPA 365.2	
.'hosphorus	0.253	0.00500	**	Ħ	1105027	09/04/01	09/05/01	Ħ	
pН	6.80		pH Units	**	1H24046	08/23/01	08/23/01	EPA 150.3	
Total Suspended Solids	430	4.0	mg/l	"	1H24022	08/24/01	08/27/01	EPA 160.2	
furbidity	187	10.0	NTU	10	1H25006	n	08/24/01	EPA 180.1	
VOR-082201-OUT (B1H0531-02) Water	r Sampled:	08/22/01 17:	24 Receive	d: 08/23/	91 13:30				
lardness	51.7	1.00 աջ	g eq. CaCO3/L	. 1	1H29021	08/29/01	08/30/01	SM 2340B	
Orthophosphate-phosphorus	0.0376	0.00200	mg/l	H	1H25010	08/23/01	08/23/01	EPA 365.2	
Phosphorus	0.253	0.00500	41	Ħ	1105027	09/04/01	09/05/01		
·H	6.87		pH Units	н	1 <b>H</b> 24046	08/23/01	08/23/01	EPA 150.1	
Potal Suspended Solids	310	4.0	mg/l	=	1H24022	08/24/01	08/27/01	EPA 160.2	
furbidity	174	10.0	NTU	10	1H25006	н	08/24/01	EPA 180.1	

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Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

# Total Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

		Reporting			Spike Sourc			%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1H27018:	Prepared 08/27/01	Using E	PA 200 Sei	ries							
Blank (1H27018-BLF	<b>(1</b> )	,									
Zinc		ND	0.0100	mg/l							
LCS (1H27018-BS1)											
Zinc	<u> </u>	0.192	0.0100	mg/l	0.200	<del></del>	96.0	85-115			
LCS Dup (1H27018-1	BSD1)										
Zinc		0.194	0.0100	mg/l	0.200		97.0	85-115	1.04	15	
Matrix Spike (1H270	18-MS1)		Source: B1H0565-01								
Zinc		0.176	0.0100	mg/l	0.200	0.0207	77.6	75-125			
Matrix Spike Dup (11	H27018-MSD1)					Source: E	31H0565-	01			
Zinc		0.180	0.0100	mg/l	0.200	0.0207	79.6	75-125	2.25	20	

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Portland

503.324.3200 Mimbus Avenue, Besverton, OR 97008-7132 503.906.9200 fax 503.906.9210 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Taylor Associates

3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported:

09/06/01 17:06

# Dissolved Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

		Reporting			Spike	Source		%REC	RPD		
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Jatch 1104034; Pr	epared 09/04/01	Using EP	A 3005A						_		
Blank (1104034-BLK1)	)										
inc		ND	0.0100	mg/l	/						
LCS (1104034-BS1)											
Tine		0.201	0.0100	mg/l	0.200		100	85-115			
.CS Dup (1104034-BS)	D1)										
Zinc		0.195	0.0100	mg/l	0.200		97.5	85-115	3.03	15	
fatrix Spike (1104034	-MS1)					Source: B	31H0531-	02			
∠inç		0.212	0.0100	mg/l	0.200	0.0171	97.4	75-125			
1atrix Spike Dup (110	4034-MSD1)					Source: B	31H0531-	02			
inc		0.213	0.0100	mg/l	0.200	0.0171	98.0	75-125	0.471	20	

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 fax 425,420,9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 569,924,9200
 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

Bend. 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC	_	RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1H24022:	Prepared 08/24/01	Using C	General Pr	eparation	•						
Blank (1H24022-BI	JKI)										
Total Suspended Solids	· .	ND	4.0	mg/l						,	
Duplicate (1H24022	-DUP1)				Source: B1H0505-01						
Total Suspended Solids	3	16	4.0	mg/l		17			6.1	19	
Batch 1H24046:	Prepared 08/23/01	Using G	eneral Pr	eparation							
Duplicate (1H24046	5-DUP1)					Source: E	1Н0531-	02			
pН		6.88		pH Units		6.87			0.145	10	
Batch 1H25006:	Prepared 08/24/01	Using G	Seneral Pro	eparation							
Biank (1H25006-BL	.K1)		'					-			
Turbidity		ND	1.00	NTU							
S (1H25006-BS1	)										
Turbidity		19.0	00.1	NTU	20.0		95.0	90-110			
LCS Dup (1H25006	-BSD1)										
Turbidity		19.0	1.00	NTU	20.0		95.0	90-110	0.00	20	
Duplicate (1H25006	-DUP1)					Source: B	1H0029-	07			
Turbidity		ND	1.00	NTU		ND			34.5	20	
Batch 1H25010:	Prepared 08/23/01	Using G	eneral Pro	eparation							
Blank (1H25010-BL	.K1)										
Orthophosphate-phosph	norus	ND -	0.00200	mg/l							

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 fax 425,420,9210

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 fax 509,924,9290

 Portland
 9405 SW Nimbus Avenue, Beaverton, DR 97008-7132 120,000,000, pp. 150,900,900

Spokane

Portland

503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, DR 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

[			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
3atch 1H25010:	Prepared 08/23/01	Using G	eneral Pre	paration							
LCS (1H25010-BS1	)						,				_
Orthophosphate-phosph	horus	0.0516	0.00200	mg/l	0.0500		103	90-110			
LCS Dup (1H25010	)-BSD1)										
Orthophosphate-phosph	horus	0.0522	0.00200	mg/l	0.0500		104	90-110	1.16	20	
Ouplicate (1H25010	)-DUP1)		Source: B1H0529-02								
Orthophosphate-phospl	horus	0.0370	0.00200	mg/l		0.0397			7.04	25	
Иatrix Spike (1H25	5010-MS1)		Source: B1H0529-02								
Orthophosphate-phospl	horus	0.0876	0.00200	mg/l	0.0500	0.0397	95.8	80-120			
3atch 1H29021:	Prepared 08/29/01	Using E	PA 3010A								
3lank (1H29021-BI	LK1)	. "									
iness	LKI)	ND		g eq. CaCO3/L							
iness CS (1H29021-BS1	· · · · · · · · · · · · · · · · · · ·	ND		g eq. CaCO3/L							
Iness	· · · · · · · · · · · · · · · · · · ·	ND 70.3	1.00mg	g eq. CaCO3/L				70-130			
lness .CS (1H29021-BS1	)		1.00mg	•				70-130			
lness  CS (1H29021-BS1  Hardness	)		1.00mg 1.00mg	•				70-130 70-130	0.142	20	
LCS (1H29021-BS1 Hardness LCS Dup (1H29021 lardness	) -BSD1)	70.3	1.00mg 1.00mg	g eq. CaCO3/L		Source: B	31H0499-	70-130	0.142	20	
hess  CS (1H29021-BS1 Hardness  CS Dup (1H29021 lardness	) -BSD1)	70.3	1.00mg 1.00mg	g eq. CaCO3/L		Source: B	:1H0499-	70-130	0.142	20	
iness  CS (1H29021-BS1 Hardness  CS Dup (1H29021 Iardness  Matrix Spike (1H29	) -BSD1) 0021-MS1)	70.3	1.00mg 1.00mg	g eq. CaCO3/L g eq. CaCO3/L	to come the substitute			70-130 <b>03</b> 75-125	0.142	20	

orth Creek Analytical - Bothell

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Spokane

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**Taylor Associates** 

3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported:

09/06/01 17:06

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1105027: Prepared 09/04/01	Using G	eneral Prep	aration			•				
Blank (1105027-BLK1)										
Phosphorus	ND	0.00500	mg/l						,	
LCS (1105027-BS1)										
Phosphorus	0.0532	0.00500	mg/l	0.0500		106	90-120			
LCS Dap (1105027-BSD1)										
Phosphorus	0.0549	0.00500	mg/l	0.0500	— <sub>7</sub>	110	90-120	3.15	20	
Matrix Spike (1105027-MS1)					Source: B	1H0566-	01			
Phosphorus	0.0914	0.00500	mg/l	0.0500	0.0399	103	60-139			-
Matrix Spike Dup (1105027-MSD1)					Source: B	1H0566-	01			
Phosphorus	0.0934	0.00500	mg/l	0.0500	0.0399	107	60-139	2.16	25	

Sorth Creek Analytical - Bothell

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Amar Gill, Project Manager

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9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 Portland 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, 08 97701-5711

541.383.9310 fax 541.382.7588

Taylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 09/06/01 17:06

#### Notes and Definitions

This sample was laboratory filtered since it was not field filtered as is required by the methodology. Q-30

DET Analyte DETECTED

Analyte NOT DETECTED at or above the reporting limit ND

NR Not Reported

Sample results reported on a dry weight basis dry

RPD Relative Percent Difference

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Page 10 of 10 North Creek Analytical, Inc. **Environmental Laboratory Network** 

Taylor Associates
3/23/01

## Particle Size Distribution Analysis Results: Storm 5 Inlet

Report Prepared for: Ingrid Weltz **Taylor Associates** Tel: 206.633.4486

Analysis Performed by: Lynel Rabago University of Washington Department of Civil Engineering Contact: Dr. David Stensel Tel: 206.543.9358

Project ID:

SR405-Vortechs

Sample ID:

VOR-101101-IN

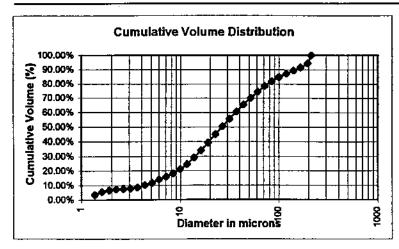
Date and Time Collected:

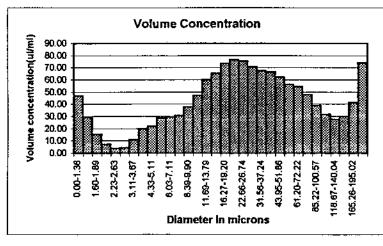
10/11/01

0:42 14:58

Date and Time of PSD Analysis:

10/12/01





524	Voturite		1,000
Range	Concentration	Volume	
(rilicitoris)	(47)	(%)	((1))
0.00-1.36	47.08	3.48%	24.94
1.36-1.60	29.60	5.67%	15.68
1.60-1.89	15.36	6.80%	8.14
1.89-2.23	7.08	7.33%	3.75
2.23-2.63	3.98	7.62%	2.11
2.63-3.11	4.65	7.97%	2.46
3.11-3.67	10.84	8.77%	5.74
3.67-4.33	19.79	10.23%	10,48
4.33-5.11	21.70	11.84%	11.50
5.11-6.03	28.64	13.95%	15.17
6.03-7.11	29.55	16.14%	15.66
7.11-8.39	30.45	18.39%	16.13
8.39-9.90	37.59	21,17%	19.92
9.90-11.69	47.25	24.66%	25.03
11.69-13.79	59.87	29.09%	31.72
13.79-16.27	65.18	33.91%	34.53
16.27-19,20	73.52	39.34%	38.95
19.20-22.66	76.39	44.99%	40.47
22.66-26.74	75.37	50.56%	39,94
26.74-31.56	70.65	55.79%	37.43
31.56-37.24	67.34	60.77%	35.68
37.24-43.95	66.54	65.69%	35.25
43.95-51.86	62.16	70.28%	32.94
51.86-61.20	56.35	74.45%	29.85
61.20-72.22	54.52	78.48%	28.89
72.22-85.22	47.80	82.01%	25.33
85.22-100.57	38.79	84.88%	20.55
100.57-118.67	31.57	87.22%	16.73
118.67-140.04	27.59	89.25%	14.62
140.04-165.26	30.04	91.48%	15.91
165,26-195,02	41.28	94.53%	21.87
195.02-212	74.01	100,00%	39.21
Total	1352.52		716.60

\*\*\*

TSS

93.69%

2.58%

1.33%

2.41%

100.00%

Mass of TSS

(THQ)

716.60

19.70

10.20

18.40

764.90

Computed Statistics \*:

Weight Mean = 53.92 microns

3.67 microns 22.66 microns  $D_{90} = 140.04 \text{ microns}$ 

Volume of Sample:

1000 ml

Volume of Dilution: 10400 ml added

Comments:

Statistics as well as graphical output include only particles < 212 micrometers.</li>

Size Range

(microns)

< 212

212-425

425-850

>850

Total

# Particle Size Distribution Analysis Results: Storm 5 Outlet

Report Prepared for. Ingrid Weltz **Taylor Associates** Tel: 206.633.4486

Analysis Performed by: Lynel Rabago University of Washington Department of Civil Engineering Contact: Dr. David Stensel Tel: 206.543.9358

Project ID:

SR405-Vortechs

Sample ID:

VOR-101101-OUT

Date and Time Collected:

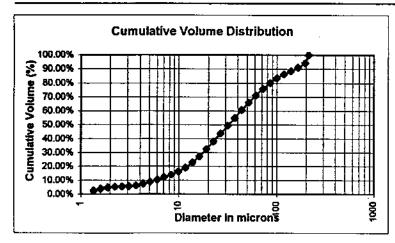
10/11/01

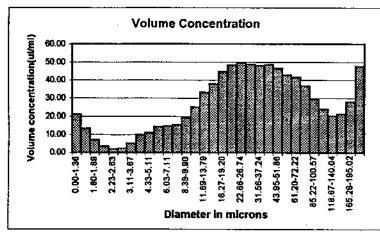
0:43

Date and Time of PSD Analysis:

10/12/01

16:57





Size	Volume	Cum alive	ÅE:EE
Range	Concentration	Volume	
(microns)	(4) / 1)	(%)	(mg) ***
0.00-1.36	21.12	2.45%	11.39
1.36-1.60	13.47	4.01%	7.27
1.60-1.89	7.12	4.83%	3.84
1.89-2.23	3.34	5.22%	1.80
2.23-2.63	1.91	5.44%	1.03
2.63-3.11	2.24	5.70%	1.21
3.11-3.67	5.26	6.31%	2.84
3.67-4.33	9.87	7.46%	5.33
4.33-5.11	11.13	8.75%	6.01
5.11-6.03	14.44	10.42%	7.79
6.03-7.11	14.75	12.13%	7.96
7.11-8.39	15.36	13.91%	8.29
8.39-9.90	19.22	16,14%	10.37
9.90-11.69	25.00	19.04%	13.49
11.69-13.79	33.17	22.88%	17.90
13.79-16.27	37.92	27.28%	20.46
16.27-19.20	44.72	32.46%	24.13
19.20-22.66	48.45	38.08%	26.14
22.66-26.74	49.90	43.87%	26.92
26.74-31.56	48.76	49.52%	26.31
31.56-37.24	47.98	55.08%	25.89
37.24-43.95	48.59	60.71%	26.22
43.95-51.86	46.56	66.11%	25.12
51.86-61.20	42.87	71.08%	23.13
61.20-72.22	41.64	75.91%	22.46
72.22-85.22	36.73	80.17%	19.82
85.22-100.57	29.68	83.61%	16.01
100.57-118.67	23.88	86.38%	12.88
118.67-140.04	20.36	88.74%	10.99
140.04-165.26	21.42	91.22%	11.56
165.26-195.02	28.00	94.47%	15.11
195.02-212	47.74	100.00%	25.76
Total	862.58		465.40

Computed Statistics \*:

Weight Mean = 58.74 microns

> 5.11 microns  $D_{50} = 31.56$  microns

 $D_{90} = 140.04 \text{ microns}$ 

Volume of Sample: Volume of Dilution:

950 ml 5600 ml added

Comments: 1/0/00

Szertanye Mass of TSS (CHACTORIE) (mg) < 212 465.40 92.58% 212-425 16.60 3.30% 425-850 12.80 2.55% >850 7.90 1.57% Total 502.70 100.00%

Statistics as well as graphical output include only particles < 212 micrometers.</li> The rest were manually sieved and included only for calculating TSS and VSS

SITE VISIT	SHEET (SR 405 V	ortechs <sup>TM</sup> Monitoring)	
Date/Time 8/20/01 high	Field Staff JA/IW	Weather Ally closely C	236)
Pre-Stro	om Visit - or Post-Storm	Visit (circle one)	
INLET		<u>OUTLET</u>	
Check Current Readings / Download		Check Current Readings / Download	
	(2:50)	ISCO Time? reset (Y/N)?	12:58, Y
Time downloaded	NS_	Level (ft.) Velocity (f/s)	0.22
level 201-1	2,026	Flow (cfs)	0-22
,		Total Flow (cf)	16,500
		Sig/Spec str.	E/2
		Time downloaded	Ph/2
	Pre - Storm V	<u>isit</u>	
<u>INLET</u>		<u>OUTLET</u>	15 /
Battery (V)	12.3	Battery (V)	12.6
Clean bottle (Y/N)?		Clean bottle (Y/N)?	<del></del>
Pump tubing ok (Y/N)? Replaced?	<u> </u>	Pump tubing ok (Y/N)? Replaced?	<del>- 1,7V</del>
Sampler tubing ok (Y/N)?	<del></del>	Sampler tubing ok (Y/N)?  Strainer ok?	
Strainer ok?	<u> </u>	Ext. desiccant ok (Y/N)? Changed?	NV
Ext. desiccant ok (Y/N)? Changed?	/V Y	Int. desiccant ok (Y/N)? Changed?	<del></del>
Int. desiccant ok (Y/N)? Changed?  Measure Dn level? Ok?	<del></del>	Measure Dn level? Ok?	
Sample Volume (ml)	2000 ml	Enable level (ft)	>0.0 f+
Inspect Rain Gage	·Y	Pacing (cf) / Sample Volume (ml)	600 cf/200 al
Sanglu enobled	<u> </u>	Simple Bubbled?	
Samples encount	Post - Storm	<u>Visit</u>	
<u>INLET</u>	v	OUTLET	v
Equipment Ran Completely?	<u> </u>	Equipment Ran Completely?	<u> </u>
Sampler Enabled (date/time)?	912001 (1:50	Sampler Enabled (date/time)?	8/2 ×1/25
	2121 19126	Composite Began (date/time)? Number of subsamples taken?	< N21 JANE 1
Number of subsamples taken?	<u>50(5(</u> ?)	Any subsample collection errors?	no
Any subsample collection errors?	#22 17:25	Last Sample (date/time)?	8/22 1/2/24
Last Sample (date/time)? Est. Sample Volume Collected (ml)	160.5 L	Est. Sample Volume Collected (ml)	10.5L
	VUR-082301-IN	Sample ID?	VOR-082201-OLL
Sample 10:	105 102201-114		
Y/N Value		Validation Criteria	<b>⊣</b> /
hrs. (if known)	Was there an antecedent dr	y period of at least six hours?	- /_ /_
în.		nan or equal to 0.25"?	$\dashv$ $\mathcal{L}_{p,n}$
hrs.	Was runoff duration greate	r than one hour?	_ pee
Y/N Value	Flow-weighted Con	nposite Sample Validation Criteria	7 nexi
Y/N Value  Y 344 K. (c. 5 tall % (approx.)	Was greater than 75% of the	ne total volume of the storm sampled?	] pee next
# subsample	Were at least 10 sub-sample	les collected at the inlet?	_ / / / / / / / / / / / / / / / / / / /
# subsample	Were at least 10 sub-samp	les collected at the outlet?	
<u> </u>	. ,		~
Was a field duplicate collected? If so,	Sample ID/	Field blank collected? If so, Sample I	D

NOTES (including any problems with equipment or maintenance activities performed):

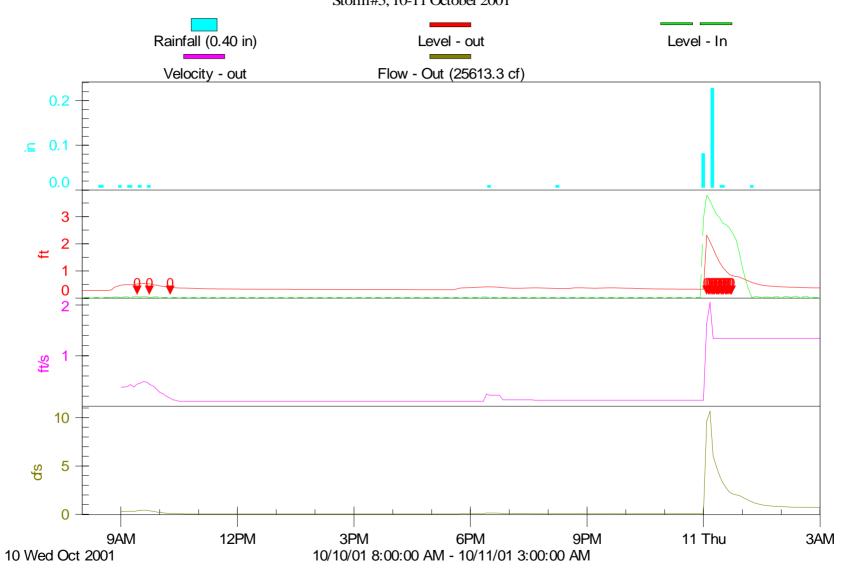
Date/Time 8/23 (01 11:15	Field Staff TP	Weather Scalleres Sh	mer ~20%)
	om Visit - or Post-Storn		<u> </u>
INLET		OUTLET	
		·	
Check Current Readings / Download	:	Check Current Readings / Downloa	ia:
ISCO Time? reset (Y/N)?	*****	ISCO Time? reset (Y/N)?	0,3864
Time downloaded	11:40	Level (ft.) Velocity (f/s)	0.45
,	DST	Flow (cfs)	D
level =	0.023 ft	Total Flow (cf)	41193.3
		Sig/Spec str.	0/0
		Time downloaded	
	Pre - Storm V		11:35 DST
INLET		<u>OUTLET</u>	
Battery (V)		Battery (V)	
Clean bottle (Y/N)?	<del></del>	Clean bottle (Y/N)?	
Pump tubing ok (Y/N)? Replaced?		Pump tubing ok (Y/N)? Replaced?	п
Sampler tubing ok (Y/N)?	<del></del>	Sampler tubing ok (Y/N)?	
Strainer ok?	<del>,</del>	Strainer ok?	
Ext. desiccant ok (Y/N)? Changed?		Ext. desiccant ok (Y/N)? Changed?	
Int. desiccant ok (Y/N)? Changed?		Int. desiccant ok (Y/N)? Changed?	
Measure Dn level? Ok?		Measure Dn level? Ok?	
Sample Volume (ml)		Enable level (ft)	
Inspect Rain Gage		Pacing (cf) / Sample Volume (ml)	
Sampler enobled	<u> </u>	Simple Enblid?	
•	Post - Storm		
INLET	\ L	OUTLET	V.
Equipment Ran Completely?	_ <del></del>	Equipment Ran Completely?	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Sampler Enabled (date/time)?	<u>8/21 09</u> :26	Sampler Enabled (date/time)?	1/21 09:25
Composite Began (date/time)?	8/21 09:26	Composite Began (date/time)?	8/21 04:25
Number of subsamples taken?	50_	Number of subsamples taken?	_50_
Any subsample collection errors?	<u></u>	Any subsample collection errors?	<u>no</u>
	9122 17:25	Last Sample (date/time)?	8/22 17:24
Est. Sample Volume Collected (ml)	10.5L	Est. Sample Volume Collected (ml)	10.54
Sample ID?	VDR -082201-11	Sample ID?	VBR-082201-04
Y/N Value		n Validation Criteria	
		ry period of at least six hours?	<del></del>
	Was total rainfall greater t		<del></del>
y ~ hrs.	Was runoff duration greate	er than one hour?	·
Y/N Value		nposite Sample Validation Criteria	
		he total volume of the storm sampled?	TOPY & by raint
	Were at least 10 sub-samp		
y 50 # subsample	Were at least 10 sub-samp	les collected at the outlet?	
Was a field duplicate collected? If so, NOTES (including any problems with		Field blank collected? If so, Sample	ID

# STORM EVENT

NUMBER 5

,		
•		

SR 405 Vortechnics Storm#5, 10-11 October 2001



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•		



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

425.420.9200 fax 425.420.9210 Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4778 509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

#### PROJECT NARRATIVE for B1J0327

Client: Taylor Associates

Project Manager: James Packman Project Name: SR405 Vortechs Project Number: Not Provided

#### 1.0 DESCRIPTION OF CASE

Two water sample were received for the analysis of:

- Total Zinc by EPA 200.8
- Dissolved Zinc by EPA 200.8
- Hardness by SM2340B
- Orthophosphate by EPA 365.2
- Total Phosphorous by EPA 365.2
- Total Suspended Solids by EPA 160.2
- Turbidity
- pH by EPA 150.1

#### 2.0 COMMENTS ON SAMPLE RECEIPT

The samples were received and logged in on 11th October 2001 at a temperature of 5.5C.

#### **Preparation and Analysis**

There were no anomalies associated with the preparation and analysis with all QA being within method established criteria. However the following analyses do need to be commented on

#### Dissolved Zinc

The dissolved metals were filtered and preserved with Nitric Acid in house prior to analysis.

Orthophosphate



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

425 420.9200 fax 425.420.9210

Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

541.383.9310 fax 541.382.7588

503.906.9200 fax 503.906.9210 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

### PROJECT NARRATIVE for B1J0327

The analytical batch percent recoveries for the Matrix Spike and Matrix Spike Duplicate were outside the method established control limits, since the remaing batch QC was within control this is not thought to be an issue

"I certify that this data package is in compliance with the Contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature."

Project Manager

North Creek Analytical



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Spekane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509,924,9200 fax 509,924,9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

. aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman Reported:

10/24/01 16:22

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VOR-101101-IN	B1J0327-01	Water	10/11/01 00:42	10/11/01 11:00
VOR-101101-OUT	B1J0327-02	Water	10/11/01 00:43	10/11/01 11:00

orth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network**  Page 1 of 10



 Seattle
 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

 425,420,9280
 fax 425,420,9210

 pokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

 509,924,9280
 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fax 503.906.9210

Bend 20332 Empire Avenue, Suite F-1, Bend, DR 97701-5711

541.383.9310 fax 541.382.7588

aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported:

10/24/01 16:22

## Total Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes		
VOR-101101-IN (B1J0327-01) Water	Sampled: 10/	11/01 00:42	Received	: 10/11/01 1	L1:00			<u> </u>			
Zinc	0.135	0.0100	mg/i	I	1J22029	10/22/01	10/23/01	EPA 200.8	<del></del>		
VOR-101101-OUT (B1J0327-02) Water	VOR-101101-OUT (B1J0327-02) Water Sampled: 10/11/01 00:43 Received: 10/11/01 11:00										
Zine	0.136	0.0100	mg/l	1	1J22029	10/22/01	10/23/01	EPA 200.8			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 



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Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, CR 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, DR 97701-5711 541.383.9310 fax 541.382.7588

\_aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported:

10/24/01 16:22

# Dissolved Metals by EPA 200 Series Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
/OR-101101-IN (B1J0327-01) Water	Sampled: 10	/11/01 00:42	Received	: 10/11/01 1	1:00	·· •		<u> </u>	
Zine	ND	0.0100	mg/l	1	1J16018	10/16/01	10/19/01	EPA 200.8	Q-30
OR-101101-OUT (B1J0327-02) Water	Sampled:	10/11/01 00:	43 Receiv	ed: 10/11/0	1 11:00				
Zine	0.0140	0.0100	mg/l	1	1J16018	10/16/01	10/19/01	EPA 200.8	Q-30

orth Creek Analytical - Bothell

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Amar Gill, Project Manager **Environmental Laboratory Network** 

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 11720 North Creek Pkwy N, Suite 400, Botheil, WA 98011-8244 425-420,9200
 Fax 425-420,9210

 Spokane
 East 1115 Montgomery, Suite B, Spokane, WA 99296-4776 503-924-9200
 Fax 509-924-9290

 Portland
 5405 SW Nimbus Avenue, Beaverton, OR 97008-7132

Spokane

Portland 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 10/24/01 16:22

# Conventional Chemistry Parameters by APHA/EPA Methods North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VOR-101101-IN (B1J0327-01) Water	Sampled: 10	/11/01 00:42	Received: 1	10/11/01 1	11:00				
Hardness	64.3	2.00 m	g eq. CaCO3/L	2	1J22023	10/22/01	10/23/01	SM 2340B	
Orthophosphate-phosphorus	0.0264	0.00200	mg/l	1	1J11034	10/11/01	10/11/01	EPA 365.2	
Phosphorus	0.922	0.0200		4	1J18027	10/17/01	10/18/01	п	
рH	7.00		pH Units	1	IJI 1035	10/11/01	10/11/01	EPA 150.1	
Total Suspended Solids	580	4.0	mg/l	#1	1312005	10/12/01	10/15/01	EPA 160.2	
Turbidity	285	10.0	NTU	10	1 <b>J</b> 11051	10/11/01	10/11/01	EPA 180.1	
VOR-101101-OUT (B1J0327-02) Water	Sampled:	10/11/01 00:	43 Received	1: 10/11/0	1 11:00				
Hardness	52.2	2.00 m	g eq. CaCO3/L	. 2	1J22023	10/22/01	10/23/01	SM 2340B	
Orthophosphate-phosphorus	0.0109	0.00200	mg/l	1	1J11034	10/11/01	10/11/01	EPA 365.2	
Phosphorus	0.764	0.0200	H	4	1J18027	10/17/01	10/18/01		
pH	6.75		pH Units	1	1J11035	10/11/01	10/11/01	EPA 150.1	
Total Suspended Solids	440	4.0	mg/l	**	1J12005	10/12/01	10/15/01	EPA 160.2	
Turbidity	154	10.0	NTU	10	1 <b>J</b> 11051	10/11/01	10/11/01	EPA 180.1	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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 11720 North Creex Pkwy N, Suite 400, Bothell, WA 98011-8244 425,420,9200
 fax 425,420,9210

 Spokane
 East 11115 Mentgomery, Suite B, Spokane, WA 99206-4776 509,924,9200
 fax 509,924,9200

Spokane

Portland 9405 SW Nimbus Avenue, Beaverton, 0R 97008-7132

503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 | fax 541.382.7568

\_aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs Project Number: Not Provided Project Manager: James Packman

Reported: 10/24/01 16:22

## Total Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1J22029:	Prepared 10/22/01	Using EF	A 200 Ser	ies					•		
Blank (1J22029-B)	LK1)										
line		ND	0.0100	mg/i							
LCS (1J22029-BS)	l)										
Line	1-1-A-1-	0.202	0.0100	mg/l	0.200		101	85-115			
CS Dup (1J22029	P-BSD1)										
Zine		0.199	0.0100	mg/l	0.200		99.5	85-115	1.50	15	
Duplicate (1J22029	9-DUP1)					Source: E	1J0332-(	)1			
Zinc		0.150	0.0100	mg/l		0.153			1.98	20	•••
Duplicate (1J22029	9-DUP2)					Source: E	1J0327-0	<del>)</del> 1			
inc		0.143	0.0100	mg/l		0.135	<del></del>		5.76	20	
Matrix Spike (1J2:	2029-MS1)					Source: E	31 <b>J</b> 0332-0	<del>)</del> 1			
		0.363	0.0100	mg/l	0.200	0.153	105	75-125			

Jorth Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 



Seattle 11720 North Creek Pkwy N, Surte 400, Bothell, WA \$8911-8244 425,420,9290 fex 425,420,9210 Fast 11115 Montgomery, Suite B, Sockane, WA 99206-4776 508,924,9290 fax 509,924,9290

Spokane

Portland 9405 SW Nimbus Avenue, Seaverton, 03 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, CR 97701-5711 549,383,9310 fax 541,382,7588

aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs Project Number: Not Provided Project Manager: James Packman

Reported: 10/24/01 16:22

# Dissolved Metals by EPA 200 Series Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1J16018:	Prepared 10/16/01	Using E	PA 3005A								
Blank (1J16018-BI	-K1)									,,	
Zinc		ND	0.0100	mg/l						-1 F-4	
LCS (1J16018-BS1	)										
Zinc		0.215	0.0100	mg/l	0.200		108	85-115			
LCS Dup (1J16018	-BSD1)										
Zinc		0.212	0.0100	mg/l	0.200		106	85-115	1.41	15	
Duplicate (1J16018	-DUPI)					Source: B	31J <del>0</del> 327-0	)1			
Zinc		ND	0.0100	mg/l		ND		THE REAL PROPERTY.	2.66	20	
Matrix Spike (1J16	6018-MS1)					Source: B	31J0189-0	)1			
Zinc		0.223	0.0100	mg/l	0.200	ND	109	75-125			
Matrix Spike Dup	(1J16018-MSD1)					Source: B	31J0189-0	)1			
;		0.221	0.0100	mg/l	0.200	ND	801	75-125	0.901	20	

North Creek Analytical - Bothell

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North Creek Analytical, Inc. **Environmental Laboratory Network**  Page 6 of 10



Seattle WA/USA, 98103

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA \$8011-8244

425.420.9200 fax 425.420 9210 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

509.924.9200 fax 509.924.9290

 Portland
 9495 SW Nimbus Avenue, Beaverton, 0R 97008-7132

 503.906.9200
 fax 503.906.9210

 Bend
 20332 Empire Avenue, Suite F-1, Bend, 0R 97701-5711

 541.383.9310
 fax 541.382.7588

aylor Associates Project: SR405 Vortechs 3917 Ashworth Ave North

Project Number: Not Provided Project Manager: James Packman

Reported: 10/24/01 16:22

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	R₽D	Limit	Notes
Batch 1J11034:	Prepared 10/11/01	Using G	eneral Pre	paration			•				
Blank (1J11034-BI	LK1)						-				
Orthophosphate-phosp	phorus	NĐ	0.00200	mg/l			•		7 - 77 - 77 - 77 - 77 - 77 - 77 - 77 -		
LCS (1J11034-BS1	()										
Orthophosphate-phosp	phorus	0.0498	0.00200	mg/l	0.0500		99.6	90-110			
LCS Dup (1J11034	I-BSD1)										
Orthophosphate-phosp	ohorus	0.0495	0.00200	mg/l	0.0500		99.0	90-110	0.604	20	<del></del>
vlatrix Spike (1J1)	1034-MS1)					Source: E	31J0324-(	)1			
Orthophosphate-phosp	phorus	0.135	0.00200	mg/l	0.0500	0.114	42.0	80-120	,		Q-0
Matrix Spike Dup	(1J11034-MSD1)					Source: E	31J0324-(	)1			
Orthophosphate-phosp	borus	0.134	0.00200	mg/l	0.0500	0.114	40.0	80-120	0.743	25	Q-0
Batch 1J11035:	Prepared 10/11/01	Using G	eneral Pre	paration							
plicate (1J11035	5-DUP1)			•••		Source: E	31J0324-(	)1			
р <b>Н</b>		7.92		pH Units		7.93			0.126	10	
3atch 1J11051:	Prepared 10/11/01	Using G	eneral Pre	paration							
- Blank (1J11051-BI	LK1)	_"			•						
Turbidity		ND	1.00	NTU				·			
.CS (1J11051-BS1	)										
Turbidity		19.1	1.00	NTU	20.0		95.5	90-110			

North Creek Analytical - Bothell

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503.506.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

. aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 10/24/01 16:22

## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

	·		Reporting		Spike	Source		%REC	-	RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1J11051:	Prepared 10/11/01	Using G	eneral Prep	paration							
LCS Dup (1J11051	-BSD1)		<u> </u>							•	
Turbidity	-	18.8	00.1	NTU	20.0		94.0	90-110	1.58	20	
Duplicate (1J1105)	I-DUP1)					Source: E	31J0327-0	1			
Turbidity		281	10.0	NTU		285			1.41	20	
Batch 1J12005:	Prepared 10/12/01	Using G	eneral Pre	aration							
Blank (1J12005-Bl	LKI)								****		
Total Suspended Solid	ls	ND	4.0	mg/l							
Duplicate (1J12005	S-DUP1)					Source: E	31J0340-0	)1			
Total Suspended Solid	ls	590	4.0	mg/l		600			1.7	19	
Batch 1J18027:	Prepared 10/17/01	Using G	eneral Prep	aration							
nk (1J18027-BI)	LK1)										
sphorus		ND	0.00500	mg/l							
LCS (1J18027-BS1	)										
Phosphorus		0.0459	0.00500	mg/l	0.0500		91.8	90-120			
LCS Dup (1J18027	-BSD1)										
Phosphorus		0.0456	0.00500	mg/l	0.0500		91.2	90-120	0.656	20	· —
Matrix Spike (1J18	8027-MS1)					Source: E	31J0442-0	)4			
Phosphorus		0.198	0.00500	mg/l	0.0500	0.195	6.00	60-139			Q

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** 

Page 8 of 10



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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132

503.906.9200 fex 503.906.9210

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541.383.9310 fax 541.382.7588

.aylor Associates 3917 Ashworth Ave North Seattle WA/USA, 98103

Project: SR405 Vortechs

Project Number: Not Provided Project Manager: James Packman

Reported: 10/24/01 16:22

# Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		ŔPĎ	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Jatch 1J18027:	Prepared 10/17/01	Using G	eneral Prep	paration							
Matrix Spike Dup	(1J18027-MSD1)					Source: I	31J0442-(	)4			<u>-</u>
hosphorus		0.205	0.00500	mg/l	0.0500	0.195	20.0	60-139	3.47	25	Q-13
Batch 1J22023:	Prepared 10/22/01	Using El	PA 200 Ser	ies							
Slank (1J22023-B)	LK1)										
, lardness		ND	1.00 mg	g eq. CaCO3/L					•		•
LCS (1J22023-BS1	1)										
lardness		35.5	1.00mg	g eq. CaCO3/L	33.1		107	70-130			
LCS Dup (1J22023	3-BSD1)										
lardness		36.9	1.00mg	g eq. CaCO3/L	33.1		111	70-130	3.87	20	
Duplicate (1J2202)	3-DUP1)					Source: I	31J03 <b>27</b> -0	)1			
Hardness		56.9	1.00mg	g eq. CaCO3/L		64.3			12.2	20	
∡trix Spike (1J2)	2023-MS1)					Source: I	31J0324-0	01			
Hardness		97.4	10.0mg	g eq. CaCO3/L	33.1	60.6	111	75-125			

Jorth Creek Analytical - Bothell

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North Creek Analytical, Inc. **Environmental Laboratory Network**  Page 9 of 10

Notes

## Particle Size Distribution Analysis Results

Report Prepared for: Ingrid Weltz Taylor Associates Tel: 206.633.4486 Analysis Performed by: Lynel Rabago University of Washington Department of Civil Engineering Contact: Dr. David Stensel Tel: 206.543.9358

Project ID:

Vortechs SR 405

Sample ID:

VOR-082201-IN

Date and Time Collected:

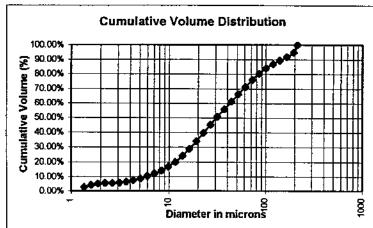
8/22/01

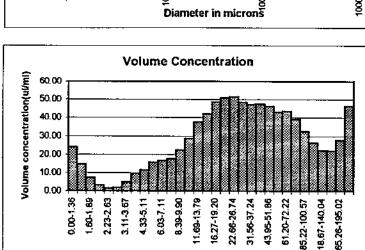
0.725694444

Date and Time of PSD Analysis:

8/24/01

0.69444444





raige	Concentration	Control Contro	
(mkJors)	(d/I)	(%)	(AC)
0.00-1.36	24.06	2.67%	11.41
1.36-1.60	14.64	4.29%	6.94
1.60-1.89	7.25	5.09%	3.44
1.89-2.23	3.15	5.44%	1.49
2.23-2.63	1.67	5.62%	0.79
2.63-3.11	1.93	5.84%	0.92
3.11-3.67	4.82	6.37%	2.28
3.67-4.33	9.69	7.44%	4.59
4.33-5.11	11.43	8.71%	5.42
5.11-6.03	15.61	10.44%	7.40
6.03-7.11	16.60	12.28%	7.87
7.11-8.39	17.71	14.24%	8.39
8.39-9.90	22.39	16.72%	10.61
9.90-11.69	28.58	19.89%	13.55
11.69-13.79	37.63	24.05%	17.83
13.79-16.27	41.94	28.70%	19.88
16.27-19.20	48.67	34.09%	23.07
19.20-22.66	50.88	39.73%	24.12
22.66-26.74	51.45	45.42%	24.38
26.74-31.56	48.50	50.80%	22.99
31.56-37.24	47.32	56.04%	22.43
37.24-43.95	47.46	61.29%	22.49
43.95-51.86	46.25	66.42%	21.92
51.86-61.20	43.09	71.19%	20.42
61.20-72.22	43.57	76.01%	20.65
72.22-85.22	39.16	80.35%	18.56
85.22-100.57	32.60	83.96%	15.45
100.57-118,67	26.30	86.88%	12.46
118.67-140.04	22.20	89.33%	10.52
140.04-165.26	22.06	91.78%	10.45
165.26-195.02	27.69	94.85%	13,12
195.02-212	46.54	100.00%	22.06
Total	902.82		427.90

Computed Statistics:

Weight Mean = 57.54 microns

 $D_{10} = 5.11$  microns  $D_{50} = 26.74$  microns

 $D_{90} = 140.04 \text{ microns}$ 

Volume of Sample:

975 ml

Diameter in microns

Volume of Dilution: 5000 ml added

Inicionsi	(mg)	# #id55 T33	THESE OF VICE	vec.
< 212	427.90	96.55%	18402.50	0.00%
212-425	5.90	1.33%	1387.50	0.00%
425-850	4.40	0.99%	1382.00	0.00%
>850	5.00	1.13%	1390.40	0.00%
Total	443.20	100.00%	22562.40	0.00%

Comments: Graphs and D-values are calculated from values given by PSA unit so these do not reflect particles greater than 212 microns, which were manually sieved out.

## Particle Size Distribution Analysis Results

Report Prepared for:

Ingrid Weltz Taylor Associates Tel: 206.633.4486 Analysis Performed by: Lynel Rabago University of Washington

Department of Civil Engineering
Contact: Dr. David Stensel

Cumulative.

Tel: 206.543.9358

Concentration

Project ID:

Vortechs SR405

Sample ID:

VOR-082201-OUT

Date and Time Collected:

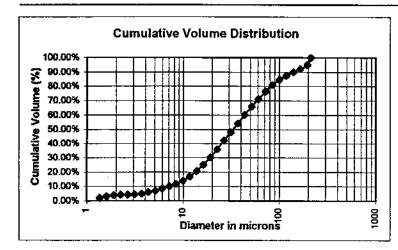
8/22/01

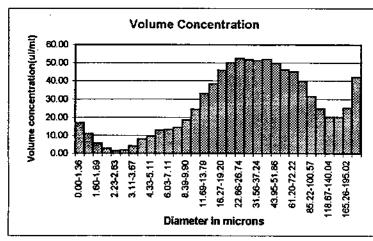
0.725

Date and Time of PSD Analysis:

8/24/01

0.772222222





(microne)	(871)	(%)	(mg)
0.00-1.36	16.97	1.96%	7.73
1.36-1.60	10.81	3.22%	4.93
1.60-1.89	5.69	3.87%	2.59
1.89-2.23	2.65	4.18%	1.21
2.23-2.63	1,49	4.35%	0.68
2.63-3.11	1.73	4.55%	0.79
3.11-3.67	4.08	5.03%	1.86
3.67-4.33	7.96	5.95%	3.63
4.33-5.11	9.49	7.05%	4.33
5.11-6,03	12.74	8.52%	5.81
6.03-7.11	13.39	10.07%	6.10
7.11-8.39	14.41	11.74%	6.57
8.39-9.90	18.53	13.89%	8.45
9.90-11,69	24.44	16.71%	11.14
11.69-13.79	33.00	20.53%	15.04
13.79-16.27	38.34	24.97%	17.48
16.27-19.20	45.92	30.29%	20.93
19.20-22.66	50.18	36,10%	22.87
22.66-26.74	52.54	42.18%	23.95
26.74-31.56	51.74	48.17%	23.59
31.56-37.24	51.22	54.10%	23.35
37.24-43,95	51.93	60.12%	23.67
43.95-51.86	49.82	65.88%	22.71
51.86-61.20	46.12	71.22%	21.02
61.20-72.22	45.10	76.45%	20.56
72.22-85.22	39.66	81.04%	18.08
85.22-100.57	31.50	84.68%	14.36
100.57-118.67	24.71	87.54%	11.26
118.67-140.04	20.21	89.88%	9.21
140.04-165.26	20.20	92.22%	9.21
165.26-195.02	25.16	95.14%	11.47
195.02-212	42.01	100.00%	19.15
Total	863.74		393.70

Computed Statistics:

Weight Mean = 58.05 microns

 $D_{10} = 6.03 \text{ microns}$  $D_{50} = 31.56 \text{ microns}$ 

 $D_{90} = 140.04 \text{ microns}$ 

Volume of Sample:

900 ml

Volume of Dilution: 5000 ml added

Comments: VSS analysis was not performed.

Size Range (microns)	Mass of TSS (mg)	% Mass TSS	Mass of VSS (mg)	% Mass VSS
< 212	393.70	97.57%	18371.00	0.00%
212-425	5.60	1.39%	1382.80	0.00%
425-850	2.30	0.57%	1375.40	0.00%
>850	1.90	0.47%	1372.70	0.00%
Total	403.50	100.00%	22501.90	0.00%

	SHEET (SK 405 V	orteens Monitoring)	
Date/Time 09/11 (3:32	Field Staff W	Weather Cun ~ 50	<del>_</del>
Pre-St	rom Visit or - Post-Storm	Visit (circle one)	
INLET		<u>outlet</u>	
Check Current Readings / Downloa	d;	Check Current Readings / Download	<b>l:</b> .
ISCO Time? reset (Y/N)?	13.49 (A)	ISCO Time? reset (Y/N)?	13:48 (KT) V
Time downloaded	,	Level (ft.)	04302
		Velocity (f/s)	* D-11*
		Flow (cfs)	<u></u>
		Total Flow (cf)	7807-2
•		Sig/Spec str.	<u>0/0</u>
	Pre - Storm V	Time downloaded	
INLET	rre-storm v	<u>OUTLET</u>	
Battery (V)	12.3	Battery (V)	12.3
Clean bottle (Y/N)?	<del></del>	Clean bottle (Y/N)?	<u></u>
Pump tubing ok (Y/N)? Replaced?	<u></u> *	Pump tubing ok (Y/N)? Replaced?	<del>y</del>
Sampler tubing ok (Y/N)?	<u> </u>	Sampler tubing ok (Y/N)?	<del>Ý</del>
Strainer ok?	<u></u>	Strainer ok?	<u></u>
Ext. desiccant ok (Y/N)? Changed?	- 1/N	Ext. desiccant ok (Y/N)? Changed?	<del>\frac{1}{\frac{1}{N}}</del>
Int. desiccant ok (Y/N)? Changed?	<del></del>	Int. desiccant ok (Y/N)? Changed?  Measure Dn level? Ok?	- White box
Measure Dn level? Ok?	- 6 cm of - age	Enable level (ft)	70.5
Sample Volume (ml) Inspect Rain Gage	200 H	Pacing (cf) / Sample Volume (ml)	450 d ROOM
_ <del>-</del>		Simple Bubled?	
Samplu enabled	Post - Storm V		- 1 -
INLET	<del></del> -	<u>OUTLET</u>	
Equipment Ran Completely?		Equipment Ran Completely?	
Sampler Enabled (date/time)?		Sampler Enabled (date/time)?	<del> </del>
Composite Began (date/time)?	<del></del>	Composite Began (date/time)?	
Number of subsamples taken?		Number of subsamples taken?  Any subsample collection errors?	
Any subsample collection errors?	<del>-/</del>	Last Sample (date/time)?	<del> </del>
Last Sample (date/time)? Est. Sample Volume Collected (ml)	<del>/</del>	Est. Sample Volume Collected (ml)	<u></u>
Sample ID?	/ <del></del>	Sample ID?	
Y/N Value		Validation Criteria	
hrs. (if known	) Was there an antecedent dr	y period of at least six hours?	
in	. Was total rainfall greater th	an or equal to 0.25"?	_
hrs.	Was runoff duration greate	r than one nour?	·
Y/N Yalue	Flow-weighted Con	posite Sample Validation Criteria	$\neg$
		e total volume of the storm sampled?	<b></b>
	e Were at least 10 sub-sampl		
	e Were at least 10 sub-sampl		<b>→</b>
Was a field duplicate collected? If so	, Sample ID.	_Field blank collected? If so, Sample II	D
NOTES (including any problems with	h equipment or maintenance	activities performed):	
* cheld alibe	then & w/s samp	he Und 1' sector from ret Comin elliment). Glibiah	dls
Sample live s	s'd to 3' tusio le	rith Comin cllowed) . Glibich	1 fine-wa
Taylor Associates not sign funt	ly ff. Bent benth	to SD ( sem as before).	3/23/01

•	SITE VISIT	SHEET (SR 405	Vortechs <sup>TM</sup> Monitoring)	
Date/Time	10/11/01	Field Staff 17	Weather <u>cod</u> (10°c) + c	cloudy
*	Pre-Sti	rom Visit - or (Post-Sto	rm Visit (circle one)	,
	INLET		OUTLET	
Check Curre	nt Readings / Download	đ:	Check Current Readings / Downloa	d٠
ISCO	Time? reset (Y/N)?	~/	ISCO Time? reset (Y/N)?	. W
	Time downloaded	D 2:30	Level (ft.)	0.339
			Velocity (f/s)	1.34
		j	Flow (cfs)	-0
		i'	Total Flow (cf)	9370
			Sig/Spec str.	-//0/
			Time downloaded	08:30 - 057
		Pre - Storm		
	INLET		<u>OUTLET</u>	
Battery (V)			Battery (V)	
Clean bottle (	-		Clean bottle (Y/N)?	
	ok (Y/N)? Replaced?		Pump tubing ok (Y/N)? Replaced?	<u> </u>
Sampler tubir	ng ok (Y/N)?		Sampler tubing ok (Y/N)?	·
Strainer ok?	. 1 (3/ADA OL 10		Strather ok?	
	t ok (Y/N)? Changed?		Ext. desiccant ok (Y/N)? Changed?	<del></del>
Measure Dn 1	ok (Y/N)? Changed?		Int. desiccant ok (Y/N)? Changed?	<del></del>
			Measure Divlevel? Ok?	<del></del>
Sample Volu		<del>/</del>	Enable level (ft)	
Inspect Rain			Pacing (cf) / Sample Volume (ml)	
Samples enob	er e	Post - Stori	m Visit > 5-64d?	<del></del>
	INLET	1051-51011	OUTLET	
Equipment R	an Completely?	<i>M</i> -	Equipment Ran Completely?	Y
	oled (date/time)?	13 x 55 10/4	Sampler Enabled (date/time)?	13:56 10/9
-	egan (date/time)?	89:24 10/10	Composite Began (date/time)?	U1:25 10/10
-	ibsamples taken?	18/20	Number of subsamples taken?	20/20
	le collection errors?	<del></del>	Any subsample collection errors?	N
Last Sample		00:42 10/11	Last Sample (date/time)?	00:43 10/11
_	Volume Collected (ml)4.		Est. Sample Volume Collected (ml) 4	
Sample ID?		7012-61101-IN	Sample ID?	VOR-101101-000
Y/N	Value		rm Validation Criteria	
Υ			dry period of at least six hours?	
Y Y		Was total rainfall greater		<b></b>
У	~18 hrs.	Was runoff duration great	afer than one hour?	
Y/N	Value	Flow-weighted C	omposite Sample Validation Criteria	
У		<u> </u>	f the total volume of the storm sampled?	20300 /23912
Y			ples collected at the inlet?	
Y		Were at least 10 sub-sam	aples collected at the outlet?	
Was a field d	unlicate collected? If so	Sample ID N/A	Field blank collected? If so, Sample I	n vÁ

NOTES (including any problems with equipment or maintenance activities performed):